

# THE IRON AGE

New York, March 22, 1917

ESTABLISHED 1855

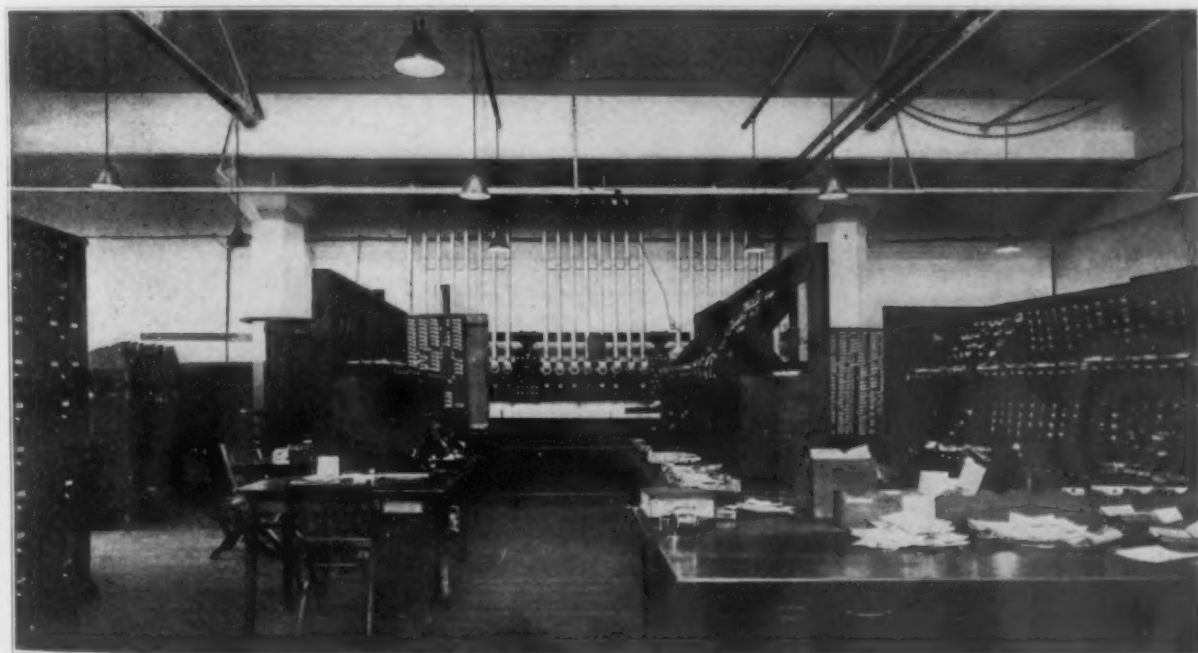
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## Pneumatic Tubes for Dispatching Orders

How Job Tickets Are Now Handled in  
Franklin Automobile Plant—A Forward  
Step in Mechanism of Scientific Management

A NOTABLE advanced step in the machinery of management has been made at the plant of the H. H. Franklin Mfg. Company, Syracuse, N. Y., maker of the Franklin automobile. It amounts to the use of pneumatic tubes for dispatching shop orders from a central point to terminals distributed about the works. Formerly the issuing of orders or job tickets was done in the way commonly followed in plants operating under scientific

the old system worked. When a workman finished a job and wished to work on a new one, he would very likely find a number of workmen at the dispatching cage so that he would have to wait his turn in handing in the old and getting the new job ticket. Often a man would start an argument over the job he was given or the job which he thought he should have. The clerk in the cage would sometimes be blamed and at any rate all the men waiting would be de-



In the racks are the job tickets against various machines for different operations. When the carrier from some department in the works is received from the pneumatic tubes, the job ticket for the completed work is replaced by a new ticket and the carrier is inserted in the tube for delivery to the department terminal

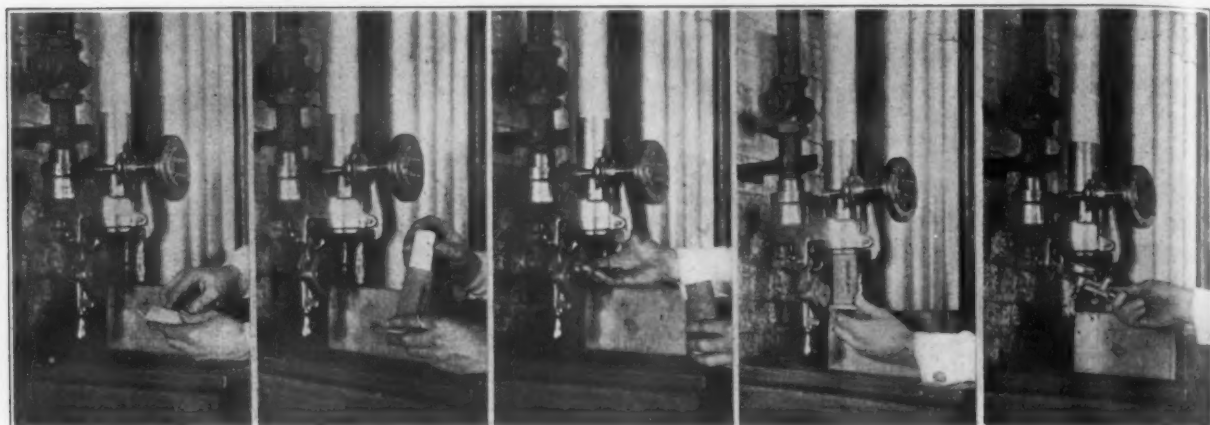
management, as is the Franklin works. Small dispatching rooms were located in the different departments and the workmen there turned in the tickets on completed work and got their tickets for the new job. The replacement of these scattered dispatching offices by the pneumatic system is the creation of George D. Babcock, production manager of the company.

The system has been installed also to transmit messages and mail matter, and when it is mentioned that the Franklin plant comprises a group of buildings more or less contiguous and several stories in height, an idea of the time economizing advantage in the system may be apprehended. The chief result which the system has accomplished, however, may be indicated by a brief explanation of the way

layed and the production of all of them unnecessarily held up.

Under the new system there may readily be more terminals than there were department cages. All the workman needs to do on finishing a job is to insert the card in the pneumatic tube carrier, wait a short time and a new job ticket reaches him through the tube. Although there are approximately 1500 jobs dispatched in a day, there is practically no delay in getting the new job ticket to the waiting workman.

The central point from which all the tubes radiate is on the sixth floor of one of the factory buildings at one end of, and in direct communication with the planning, tool and operation department. The departmental dispatch cages have thus in effect been



At each pneumatic tube terminal throughout the shops is posted a group of pictures to show the workmen how to use the tube. In the first picture is shown the rolling of a job card and in the second how it is inserted in the carrier. In the third the air coming out of the tube is tested; if air is felt issuing, the carrier must not be inserted, as there is another on its way to the terminal. In the fourth is shown the method of inserting the carrier, and the fifth the valve is closed and the carrier sent on its journey.

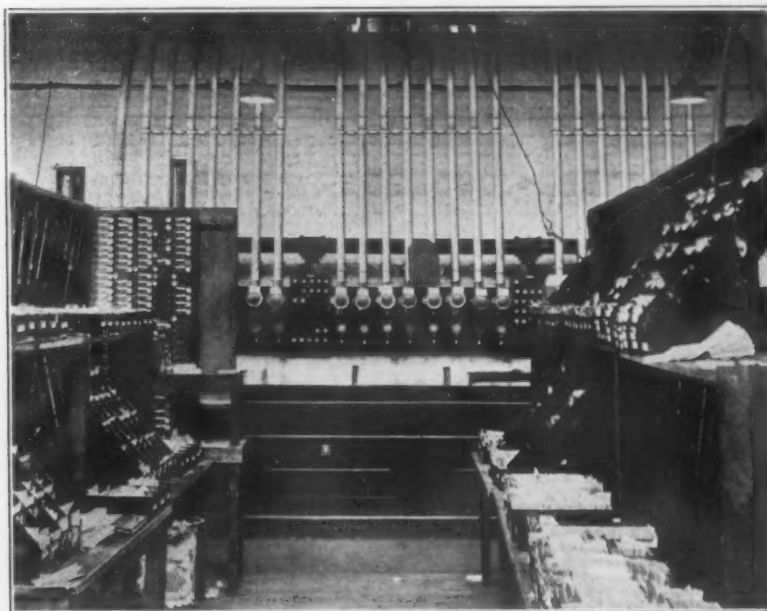
moved to the planning room. Here is also the production manager's office and the control boards (already illustrated in these pages) which show at a glance if the rate of manufacturing of any part or assembly is clearly up to the required schedule in order that completed parts may be delivered on time. Indeed the path from the factory manager's office to the workman's hands is so short and the information of the organization is so entirely within his control that plant supervision has become one of the small problems of the works.

The centralization of the machinery of putting work through the factory makes for a quick adjustment of any difficulties which the workman may have with regard to machine or tool breakage, slowness of machine with resulting loss of premium, working on jobs out of their regular date order, etc. Also it has eliminated, as stated, personal contact between the workmen and the dispatching clerks and thus unnecessary conversation is a thing of the past. The result is a more rapid handling of the jobs and a greater degree of harmony between management and men because of the rapidity and ease of adjusting difficulties, for which often the clerk in the cage was unjustly blamed. Now, the workman waiting at the tube terminal, knows there is nothing personal about his designation to a given job and that if the lot of material is not at his machine or the machine

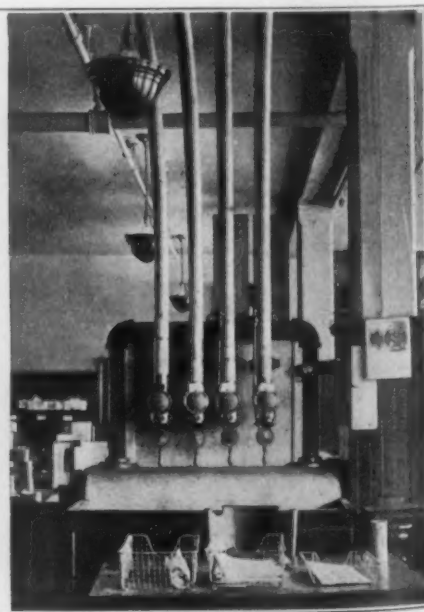
is broken, the difficulty is easily taken care of by action of the proper persons in the planning department.

The system comprises 3500 ft. of tubes in 25 lines, three of them 3 in. in diameter and the remainder 2¼ in. The system is operated by compressed air, an electrically driven compressor with a 35-hp. motor being provided. The carriers are of leather slightly less in diameter than the tubes and each is fitted with a felt washer at the bottom large enough to fit the tube snugly and act as a gasket or piston against which the air pressure acts.

At the central dispatching point or pneumatic tube desk is a row of pegs corresponding to each tube. When a carrier has been emptied it is inverted on one of the pegs. It remains there the short interval required in getting the new job ticket before being returned to the tube. The number of inverted carriers thus indicates the number of men waiting at a terminal. If three carriers, for example, are found inverted at one tube, it follows that there are three men waiting for new tickets at the terminal. The work of the dispatching room is done so rapidly that seldom are there as many as three men waiting for jobs in the same department. The group of small photographs here reproduced was made from a set of instruction photographs placed at each tube terminal. They are regarded as neces-



In this nearer view of the pneumatic tube desk may be noted a number of carriers inverted on pegs. The clerks have gone for new job tickets and a man is waiting at each terminal for which there is a pegged carrier.



In the main office a pneumatic tube station is provided for the dispatch of mail matter, shipping orders, etc.

sary because the men, not knowing the principles of the pneumatic system, may make mistakes and a delay in production is sufficiently costly to warrant every effort to explain its use. It may be added that a move ticket is stamped and sent along with the job ticket to a terminal and the move ticket remains at the terminal for the attention of the head move man. It will be recalled that the use of move men so called, working under the instructions of move tickets, is a feature of scientific management. The move ticket of course authorizes the movement of stock to and from machines and departments. The head move man makes a round of terminals on his floor every 5 minutes and turns the move ticket over to a regular move man, who takes away the finished lot at the given machine and brings up the new lot.

One of the illustrations shows a terminal point of tubes used for dispatching the office and factory mail. This is located at the main office and the tubes are used, for example, for sending shipping orders to the shipping department and for distributing factory mail.

### Safety Work in Ohio

The third annual Industrial Safety Exposition under the auspices of the Industrial Commission of Ohio and the second annual meeting of the Society of Ohio Safety Engineers were held in Columbus, Ohio, last week. The meeting of the Safety Engineers was held at the Columbus Athletic Club, March 8, and was followed by a banquet in the evening which was attended by a number of guests, including men interested in safety work in other states and men associated with industrial companies that manufacture safety appliances.

The Society of Ohio Safety Engineers is said to be the only State organization of the kind in the country, and the line along which it will conduct its activities is of considerable interest generally to men associated with safety work. Its active membership is limited to men whose principal occupation for two years has been accident prevention work and who have been engaged in responsible positions in an engineering or mechanical capacity for at least three years. However, an approved professional diploma is considered equal to two years' engineering or mechanical experience. Associate members must be qualified by business relations and practical experience to co-operate with the active members, but they are not entitled to a vote. It is the aim of the society to maintain a high quality of membership rather than to secure a large number of members. At present its membership is 20, of whom 18 are active members.

The society will hold meetings every three months, and for the present Cleveland will be the regular meeting place. Half of each session will be devoted to the consideration of one particular safety subject. The human side of safety work will be avoided as much as possible, attention being mainly given to mechanical safety devices. The aim will be to get mechanical safety equipment on an engineering basis. Following the discussions on a particular safety subject the society will pick out devices, not necessarily patented appliances, that it regards as best for the prevention of accidents in that particular field, and will make these the subjects of pamphlets that will be prepared and sent out to members. However, the society, in picking out the devices that it deems the best for a certain line of accident prevention, will avoid giving them its official approval.

C. E. Pettibone, director of safety and welfare of Pickands, Mather & Co., Cleveland, was re-elected president of the society. Other officers elected were vice-president, J. M. Woltz, safety director of the Youngstown Sheet & Tube Company; secretary and treasurer, E. R. Rose, secretary of the general safety committee of the Republic Iron & Steel Company; assistant secretary and treasurer, G. F. Hudson, safety engineer Republic Rubber Company, Youngstown.

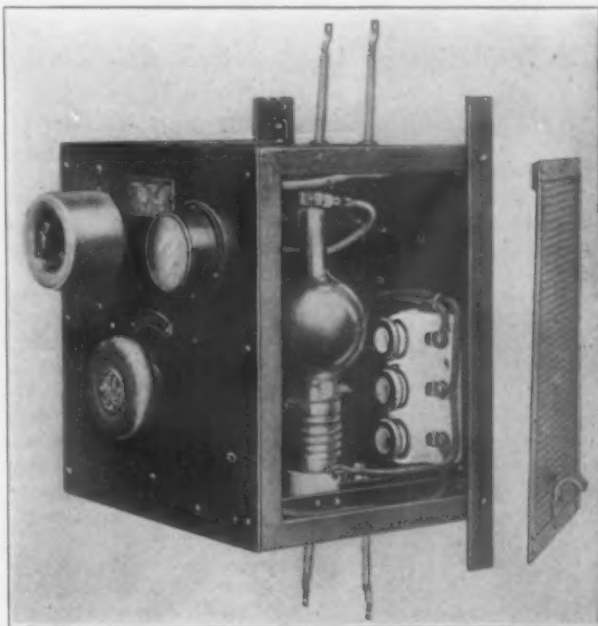
In the safety exhibit under the auspices of the Ohio Industrial Commission a large number of safety ap-

pliances were shown, and all attracted much interest. While many were similar to those displayed at the previous State exhibits, there were a number of new ones. Among these was a very interesting exhibit by the American Rolling Mill Company, Middletown, of a model of a cross section of its open-hearth plant, showing the charging and pouring sides, two furnaces, cranes, etc., the safety features being distinguished in green and the other parts of the model being painted black.

### Rectifier for Automobile Charging

The General Electric Company, Schenectady, has developed a rectifier for use in the recharging of automobile storage batteries. It is designed to convert 60-cycle alternating current at a potential of 115 volts into direct current, the capacity of the unit being 450 watts at 6 amp. and 75 volts.

The apparatus is inclosed in a perforated sheet iron casing. The voltage at which the batteries are charged can be adjusted according to the number of cells connected in the circuit. A compensator with 15 taps is provided, and these are cut in and out of the circuit by manipulating the dial switch at the lower left of the accompanying illustration, the amount of current flowing up to the maximum of 6 amp. being indicated on the instrument to the right and above the dial

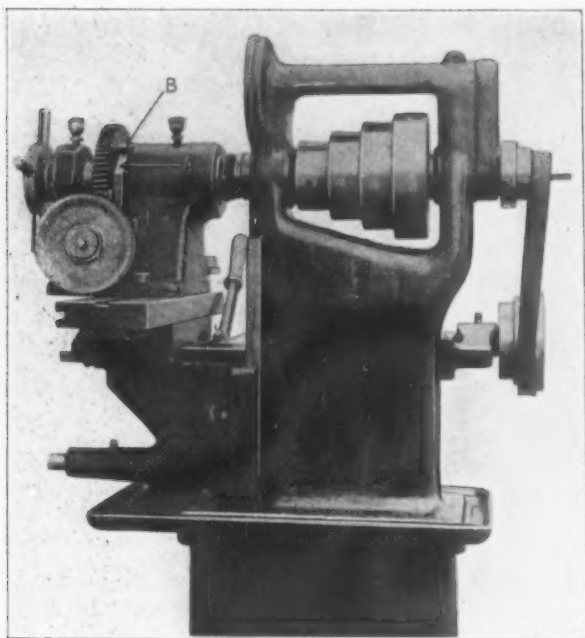


Alternating Current at 115 Volts Is Converted Into Direct Current at 75 Volts for Charging the Storage Batteries of Automobile Starting and Lighting Systems, the Amount of Current Being Regulated in 15 Steps up to 6 Amp.

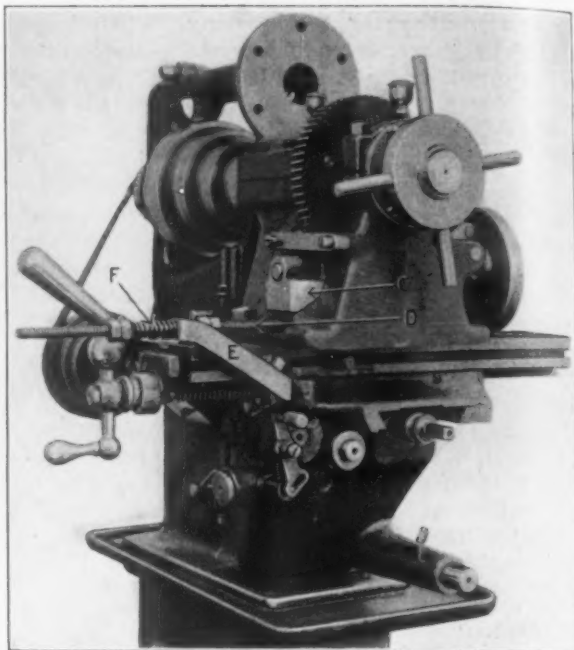
switch. After the two upper wires are connected to the alternating-current source of supply and the direct-current leads coming out of the bottom of the rectifier are connected to the batteries, the charging process is started through the alternating-current snap switch at the upper left corner. This is of the triple-pole type, one pole being in the direct-current circuit and the other two in the alternating-current supply. The batteries, which have from one to three cells, are connected in series, it being possible to charge as many as 30 cells of battery at one time. It is pointed out that if the supply of current should fail for any reason the battery will not discharge through the rectifier but will start recharging when the current comes back on the line.

Tests made on the rectifier have shown that the cost of charging is about 3c. per hr. per cell when 30 cells are being charged and 4c. when 15 cells are connected to the rectifier.

The shipments of beehive coke in February, 1917, showed a decrease of 18.9 per cent, compared with January, 1917, according to the United States Geological Survey, and a decrease of 20.1 per cent, compared with February, 1916.



The Revolution of the Spindle Is Controlled by the Stop Plate A and the Two Pins B, One of Which Is Shown



Pieces Not More than 4 In. Long Can Be Threaded Either Internally or Externally

## A THREAD-CUTTING MACHINE

### Of Semi-Automatic Type for Inside and Outside Work on Ammunition

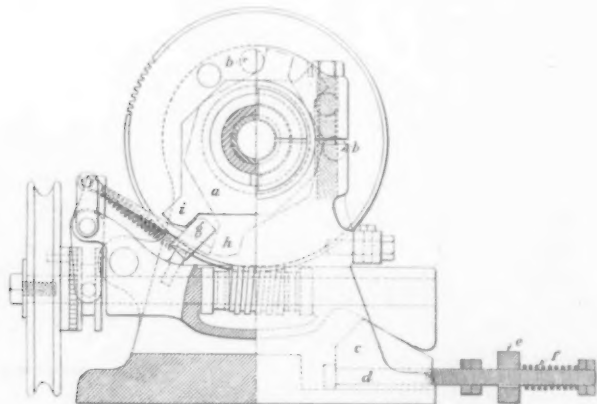
Milling external and internal threads on ammunition is the special field for which the American Ammunition Company, Inc., 25 Broad Street, New York City, designed a semi-automatic machine. The attachment, which was the special feature of the machine, is now being offered for general thread milling work where the pieces are not more than 4 in. long and 1 3/4 in. in diameter over all, with a 1-in. bore. A multiple-tooth straight relieved cutter is used, the work being finished at a single revolution. If it is desired to take a final finishing cut, the change of a single screw will enable the machine to make two revolutions, one for the roughing cut and the other for the finishing. By changing the lead screw and nut threads of any pitch up to 1/2 in., either right or left hand, can be cut.

The machine is entirely automatic in operation, it being simply necessary to move the table backward or forward and open or close the collet for external threading work, while for internal work the cross-slide of the machine has to be moved in addition. Any hand or screw feed milling machine can be used, and where a greater angle is being cut than can be taken care of with the clearance provided by the cutter, the milling attachment can be raised or lowered to locate the cutter either directly underneath or on top of the work and the attachment is set at the proper angle to clear the

thread. The spindle, gears and lead screws are case hardened and the nut is of bronze with provision for taking up the wear.

The stop plate A, *a* revolves loosely on the hub of the gear and is stopped by the two pins B, *b* giving a total of about 1.1 revolutions to the spindle. The wedge C, *c*, which is attached to a stationary part of the frame or the knee of the milling machine, brings the driving worm into contact with the wormwheel adjacent to the stop plate. In this way, when the table and the milling attachment are moved forward, the worm is automatically brought into contact with the wormwheel and starts the machine in motion, while the withdrawal of the work reverses the motion and releases the worm. The rod D, *d* passes through a hole in the arm E, *e*, which is fastened to the stationary part of the machine, the motion of the rod being regulated by two pairs of lock nuts. A spiral spring is located behind the lock nuts for bringing the arm into full contact and causing the work to revolve before the cutter bears against the work. The compression of the spring F, *f* makes an additional forward motion of the table to the full required depth possible. A round belt running over the countershaft drives the feed pulley continuously.

In operating the attachment the table is run back and the piece to be threaded is placed in the collet, which is then closed by the pilot wheel on the end of the spindle. This motion revolves the spindle until the loose stop plate A, *a* bears against the stop *g*. The forward motion of the table by either lever or screw automatically brings the worm into mesh and starts the work revolving, this motion beginning just before the cutter bears against the work. The revolution of the work and the cutter continues until the loose stop plate assumes the position *h*, when the clutch is thrown out of engagement and the machine stopped. The return movement of the table causes the worm to drop and releases the wormwheel, thus enabling the collet to be opened by the handwheel and the finished piece removed. The placing of another piece in the collet and the closing of the latter brings the stop piece to the starting point *i* and the cycle of operations is repeated.



The Automatic Arrangement for Controlling the Spindle Motion and the Means for Feeding the Table Forward Are Shown in This Elevation, Which Is Partly in Section

The Tennessee Cast Iron Pipe Company, Rockwood, Tenn., has been organized by the election of F. H. Clymer, president, and J. R. McWane, Lynchburg, Va., vice-president and general manager. The capital stock of \$100,000 has been subscribed and it is proposed to call for the first subscription on April 1 and begin operations for the construction of the plant on that date. A five-acre site has been donated by the Roane Iron Company.

## Too Many Structural Shapes

There are too many structural steel sections rolled, or at least too many weights of the various sections, according to J. A. McEwen, sales manager Pittsburgh Bridge & Iron Works, Pittsburgh. In a discussion following the presentation of two papers on cost of structural steel shop work, read before the Engineers' Society of Western Pennsylvania on Oct. 31, 1916, Mr. McEwen said that the weights of beams and channels should be limited to one or possibly two different weights on each section.

"We think it would also be wise," he continued, "especially in busy seasons such as we have at the present time, that the mills should discontinue rolling great numbers of sections found in the handbooks. This would simplify matters very much and enable the warehouse to carry the majority of sections really necessary. The selection of sections in designing is largely a matter of judgment and should be done only by those who are familiar with sections obtainable, and these sections should be limited in number to the fewest possible."

In regard to specifications for structural steel work, he held that there are entirely too many of them. Many have foolish clauses making shop work more expensive than necessary, such as requiring great numbers of stitch rivets in tension members, unnecessary numbers of separators, etc. "Why not have uniform specifications for buildings and also for bridges?" he said. "We do not see why the various engineering societies of the country do not have committees appointed to adopt uniform specifications."

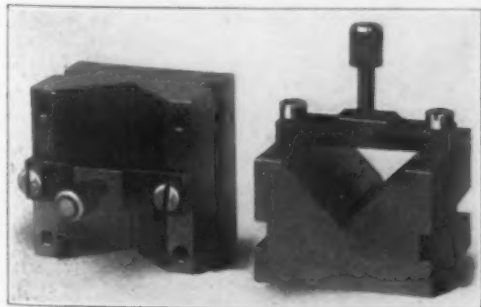
The papers mentioned were contributed by E. W. Pittman, manager McClintic-Marshall Company, and George H. Danforth, structural engineer Jones & Laughlin Steel Company. Discussing these subjects in closing the meeting, Mr. Danforth said:

"In regard to the matter of beams and channels in only one or two weights, nobody wishes that more than I do, but I do not think I shall ever see it. The rolling mills of this country, for the last ten or twelve years, I think, without exception, have picked from the shapes they made and have indicated in some way in their various handbooks, by asterisk or otherwise, the sections they urge used. Yet within the last two weeks I have seen a firm of engineers in good standing throughout the country call for such a monstrosity as a 15-in. 90-lb. beam.

"I would like to see uniform specifications but do not think I shall do so. When you begin to talk of specifications, you come to the matter of personal equation, and it is the personal equation of the men that counts. We all have our own ideas, notions and opinions and some of us like to have those notions, ideas and opinions given a little weight."

## A New V-Block with Special Clamp

The Simplex Tool Company, Woonsocket, R. I., has placed a new type of V-block on the market. It is made of hardened steel and is finished by grinding on all surfaces, the height being  $1\frac{3}{4}$  in. and the width and the depth  $2\frac{1}{2}$  in. each. The clamp is of special construction to permit the block to be used on its side and two grooves are provided in the sides for clamping purposes.



A Special Clamp Enables This V-Block to Be Used on Its Side, While the Grooves in the Sides Provide for Clamping Purposes and at the Same Time Leave the Top Clear

The blocks are made in pairs which, it is emphasized, will give perfect alignment when used together. A block may be used either resting on the base or on the side. In the former case it is possible to remove the regular clamp and employ the two grooves in the sides for clamping purposes thus leaving the top clear for the work. When the block is being used on its side, it is pointed out that the clamp, by reason of its special design, will not interfere. The V is ground to give a 90-deg. angle, the point being centrally located with reference to the sides. A line passing through the center of the V is parallel to the sides and the base and is at right angles to the ends.

## New Type of Remote Control Switch

The closing of the switch contacts by magnetic force and the use of a mechanical latch to hold them in that position are features of a new line of remote control switches developed by the Cutler-Hammer Mfg. Company, Milwaukee. As current is consumed only at the opening and closing of the switch, which is made in single, double and triple pole types, it is economical from the standpoint of current consumption. The switches are made with a capacity of 100 amp. for use on either alternating or direct current circuits. One of the applications of the switches is the control of lighting circuits from a distant point or central location, the advantage of this arrangement being that needless use of current is eliminated and it is not necessary to run circuit wires for long distances to reach a desirable location for controlling a number of circuits.

The contact fingers used are of the builder's standard type for control apparatus and are made of cold-rolled copper, a wiping motion in closing being relied upon to keep the surface clean. Two solenoids are employed for operating the switch, one for closing and the other for opening. They are energized by circuits connected to push button control switches, which may be placed where desired. When the closing solenoid has operated and the contact has been made, the fingers are held in place by a mechanical latch. To open the switch the other solenoid is operated to force the contacts apart.



This Remote Control Switch Is Opened and Closed by the Energizing of Push-Button-Controlled Solenoids and the Contacts Are Kept Closed by a Mechanical Latch, thus Reducing the Amount of Current Consumed

## Oil Fuel Saved by Mechanical Soot Blowers

A saving of 3.9 per cent in the amount of oil fuel consumed was effected by the use of mechanical soot blowers at a central station on the Pacific coast, according to the Diamond Power Specialty Company, Detroit. The temperature of the stack gases was reduced from 553 deg. Fahr. to 483.75 deg., and at the same time the temperature of the superheated steam was raised from 499.5 deg. to 502.5 deg. The apparatus was installed in two 822-hp. Stirling boilers and consisted of six revolving units for each boiler, one at the top and one at the bottom of each pass, the units consisting of a 2-in. pipe extending the entire width of the boiler with special Venturi nozzles spaced between each line of tubes.

The Sykes Metal Lath & Roofing Company, Warren, Ohio, has discontinued its warehouse at New York, and will now take care of all its Eastern business direct from the home office at Warren.

# Corporation Confident as Arguments Close

Justices Enliven Proceedings by Colloquies  
with Attorneys—Solicitor General Declares No  
Effort Being Made to "Dissolve Judge Gary"

WASHINGTON, March 20, 1917.—Great confidence in the outcome of the case against the United States Steel Corporation marked the demeanor of its counsel upon the close of the hearing before the Supreme Court last week. While experienced observers of proceedings before this great tribunal are disposed to discount all surface indications including the bias of individual justices, as indicated by their interrogatories, the attorneys for the corporation and many lawyers of wide experience, who followed the arguments closely, point to substantial reasons for the impression that the court will differentiate the case of the big steel combination from those brought against the American Tobacco Company, the Standard Oil Company, the International Harvester Company, and others which either by the Supreme Court or by the courts below have been decided in favor of the Government.

Solicitor General Davis and his able staff were manifestly handicapped in presenting the case against the Steel Corporation by the fact that they had but just completed the presentation of their arguments in this court against the Harvester Company, which was charged not only with acquiring all but a small fraction of the trade of the industry with which it is identified, but with employing questionable methods to suppress competition. The Government's attorneys were also at a disadvantage in seeking to apply to the steel combination the rulings of the Supreme Court in the American Tobacco and Standard Oil cases in both of which substantial monopoly of the industry and unfair competitive methods were held by the Court to have been essential features.

Counsel for the corporation, on the other hand, took every possible advantage of the strong contrast presented between the policy pursued in the formation of the big steel combination and in its fair dealing with employees, competitors and consumers, dwelling with special emphasis upon the high code of ethics adopted for the guidance of the corporation in all its dealings. So strong was the

apparent impression made upon the court by this feature of the arguments of Mr. Lindabury, Mr. Reed, and Mr. Severance that Solicitor General Davis, in his closing argument, felt that it was necessary to remind Chief Justice White and his associates that the case at bar was not a proceeding to "dissolve Judge Gary" and to urge that however just and fair and farsighted the past and present policies of the Steel Corporation might be, a new group of officers might change them and employ the great power and influence of the "super-combination" for far less altruistic purposes.

The possibility, amounting almost to a probability, that the court will hand down its decision in the Steel case as well as in the Harvester case before the adjournment of the present term in June lends an added interest to these proceedings. While there are other important issues before the court, the impression gathered by experienced court officials and by other competent observers is that the anti-trust cases will be taken up promptly and ruled upon as expeditiously as is practicable.

Following the close of the report in last week's IRON AGE, Henry E. Colton, special assistant to the Attorney General, argued at length to show that the various subsidiaries, combined to form the Steel Corporation, manufactured competing lines of products and were active rivals until consolidated. David A. Reed, for the corporation, replied to Mr. Colton, describing the non-competitive character of the subsidiaries at the time the corporation was organized. Cordenio A. Severance, on behalf of the appellees, analyzed the decisions of the Supreme Court and other tribunals under the Sherman act as applied to the Steel Corporation, contending that on every essential point in the issue the conduct of the corporation was easily differentiated from the several combinations that had come under the ban of the court. George Wellwood Murray presented a brief argument on behalf of the so-called Rockefeller interests and Solicitor General John W. Davis summed up the case for the Government.

## Mr. Colton's Argument for the Government

Mr. Colton made an extended argument directed chiefly to demonstrating that there was a great deal of competition between the subsidiary companies before the "super-combination" was formed. He quoted figures showing the contemporaneous production by several of the companies of rails, plates, structural shapes and other products, and declared that while geographical location did result, as Mr. Lindabury claimed, in preventing such concerns as the Illinois Steel Company from shipping their products into Pennsylvania and other Eastern States, it did not prevent the Carnegie Company from distributing rails, plates, structural steel and other articles all over the West in direct competition with the output of the Illinois Steel Company.

Justice McKenna asked whether it was the Government's claim that any of the subsidiary companies were "fully integrated" in the sense in which the term has been used in this case, to which Mr. Colton replied that several of them were "wonderfully integrated" and were able to take the ore from the ground and make it into nearly all the chief products of the industry. Continuing, Mr. Colton quoted

Messrs. Carnegie, Frick and Schwab as constantly referring to the competition of the Illinois Steel Company, especially in rails. This, he asserted, clearly demonstrated that there was open rivalry between the Carnegie Company and its competitors, and, furthermore, he declared that the entry of the National Steel Company into rail making and the failure of the Illinois Steel Company to live up to the then existing pooling arrangement were two powerful considerations which had much more to do in bringing about the organization of the "super-combination" than any desire on the part of its promoters to "integrate the industry" or to put themselves in position to develop foreign trade.

### Belittles the Foreign Trade Development

Counsel for the corporation, Mr. Colton said, had devoted a great deal of time to expatiating upon the extraordinary development of the foreign trade of the big combination, and had spoken of this form of the corporation's enterprise as though it were highly creditable. Nevertheless, he asserted, the leading steel

products of the corporation have been almost invariably sold to foreign customers at lower prices than to domestic consumers.

"What do you deduce from that statement?" asked Justice Pitney.

"That it is questionable whether this foreign trade, so much emphasized, is really as valuable to the industrial development of this country as counsel would have us think," replied Mr. Colton.

Referring to the claims made on behalf of the corporation that its competitors were well treated and were always "friendly" to it, Mr. Colton said that there was no reason why the little rivals of the giant combination should not exhibit "friendliness" as long as they were "permitted to stand under the corporation's big umbrella." As manufacturers they may have benefited by the influence of the corporation in maintaining prices, and they certainly would not quarrel with it on that account. The question for the Court to consider, however, was rather the influence of such a combination upon the consuming public than upon competitors who secured larger profits as the result of price maintenance.

#### The Position of the Rockefellers

George Wellwood Murray, attorney for John D.

Rockefeller and his son, John D. Rockefeller, Jr., who were made defendants in this case by the Government's petition, argued briefly that there was no basis in the record for bringing his clients into the case. The Rockefellers, he said, had sold to the corporation the Lake Superior Consolidated Iron Mines, Duluth, Missabe & Northern Railway Company and Bessemer Steamship Company, but they did so merely as vendors and in no sense as co-partners were they interested in the organization of the corporation. They owned certain properties and facilities which the corporation wished to buy, and upon these they put a cash price which the corporation accepted, the amount being \$56,500,000. A part of this sum was paid in cash and the Rockefellers took the remainder in stock of the Steel Corporation at the market price, their position being exactly the same as if they had received the whole price in cash and then invested a portion of it in the stock of the corporation. For a short time, from 1901 to 1904, they had served as directors of the corporation, representing the stock they owned, but they both retired from the directorate more than seven years before the Government's suit was even thought of. On the record, Mr. Murray therefore insisted, his clients had never participated in the formation of the corporation.

## Mr. Reed on Alleged Ore Monopoly

David A. Reed, for the Steel Corporation, discussed in detail the Government's charge that the corporation had attempted to monopolize the sources of raw material of the steel industry. In trying to show the so-called "preponderance" of the corporation in the ownership of iron ore, Mr. Reed said, the Government in its statistical tables had excluded all ores owned by competitors of the combination which were not in the immediate proximity of those owned by the corporation.

"There is not an atom of evidence in this voluminous record," said Mr. Reed, "showing that any competitor of the Steel Corporation ever had the slightest difficulty in purchasing ore deposits. All the witnesses examined show a frank skepticism as to the power of the corporation to monopolize the ore supply, and they evince a most unbecoming lack of appreciation of the Government's attempt to protect them against the aggressions of the corporation."

"Any competitor of the corporation, for a long time past, could have purchased within a period sufficient only for the drawing of the necessary papers, a 50 or 60 years' supply of ore. There is no contradiction anywhere in the record of this fact and the testimony is as clear as language can make it that it is humanly impossible for any interest, no matter how powerful, to monopolize the iron ore of any important district for the simple reason that any attempt at monopoly would merely stimulate development. We have it on high scientific authority that in the Lake Superior district alone there are not less than 67,000,000,000 tons of ore of the same standard of merchantability as prevails in the principal ore producing regions of Europe, or enough to supply the entire industry of this country for 2000 years."

Mr. Reed added that the corporation controlled only a very small part of either the red or brown ores of

the Birmingham district and of the valuable Cuban ore deposits only one-seventh as much as its leading competitor.

#### The Corporation's Foreign Selling Policy

Mr. Reed then took up the charge made by Mr. Colton that the Steel Corporation sells to the foreign consumer at lower prices than to the domestic user. This allegation, he said, was based upon prices made f.o.b. the mill, which was an unfair method of figuring. As the consumer paid the freight, it was a simple matter to show that the delivered cost of exported products, including the freight, would average far more than the price paid by the domestic consumer. Both Justices Pitney and McKenna manifested a lively interest in this phase of the subject, Justice Pitney suggesting that the corporation had found it necessary to cut prices in order to get into competitive markets in foreign countries.

"Exactly," replied Mr. Reed. "We have been obliged to sell at whatever prices we could get, and we have been obliged to compete with the Government-aided kartels of Germany and with the big British combinations of producers. Of course we have encountered all sorts of difficulties, and it has taken much patience to build up our export trade."

Justice McKenna here sought to secure from Mr. Reed a definition of the word "undue" as applied to restraint of trade, and an interesting colloquy ensued.

"In using the word 'undue,'" replied Mr. Reed, "I mean just what the court meant in the Standard Oil case. Your honor knows better than I do just what was meant in that decision."

"You should not answer my question by asking me another," admonished Justice McKenna.

"I did not mean to evade your question," rejoined Mr. Reed, "and I will answer it seriously and as well

#### No Desire to Dissolve Judge Gary

Justice Pitney interrupted Solicitor General Davis at one point in his argument to ask whether he had anything to suggest as to the practical form in which relief should be granted by the court in case it should be found that the Government is entitled to it, to which the Solicitor General replied that he would discuss that phase of the case in closing. He added:

"If your honors please, I desire to say that this is not, as our friends seem to believe, a suit to dissolve Judge Gary. We are not asking the court either to dissolve Judge Gary or to abolish him. We are not asking the court to disapprove his views about business, but we are holding up to the court the nature of the combination he has formed, and it is expressed in the language of one of the competitors, Mr. Campbell, of the Youngstown Company when he said, 'I believe if Judge Gary were to die, there would be a good many of us lying awake of nights.'"

as I can. I think we can take the decision in the Nash case as a fair definition. The court in that case defined 'undue restraint' as such an interference with the normal operation of competitive conditions as unreasonably and seriously hampers the flow of commerce."

Mr. Reed insisted that the corporation had never restrained trade unduly and called attention to the steady decline that had occurred in the corporation's share of steel production.

#### Trade Conditions Discussed

Justice Pitney interrupted to ask if it was not common for big corporations to show great fluctuations in the amount of their production, to which Mr. Reed replied in the negative, adding that the output of the American Tobacco Company had increased steadily and that the production of the Standard Oil Company had declined but little.

Chief Justice White dissented vigorously from Mr. Reed's statement concerning the Standard Oil Company, drawing from Mr. Reed the explanation that he referred to the company's pipe-line and refinery operations and not to its production of crude oil, whereupon Justice White signified his agreement with the statement.

In reply to a question by Justice Pitney as to how many real competitors the Steel Corporation now has, Mr. Reed said that the answer would depend upon the character of the product. It was obliged to meet eight or nine rivals in practically every article produced and two hundred or more in some things. Justice Pitney also asked the ratio of the output of rails of the corporation's largest competitor, to which Mr. Reed replied that it was about one-fourth, figuring on the basis of conditions when the testimony in this case closed. If the calculation could be made to-day, he said, the ratio of the largest single competitor would be considerably greater owing to recent consolidations of several large producers.

Mr. Reed urged the court not to fall into the error of accepting the Government's contention that the conditions prevailing in the industry immediately before the Steel Corporation was organized were normal. On the contrary, he said, they were distinctly abnormal, and the stabilizing of prices on a somewhat higher level which immediately followed the formation of the combination was merely a return to the normal. This stabilizing, he insisted, should not be confounded with an attempt to fix prices or to raise them. It had simply been the policy of the Steel Corporation to endeavor to steady the market and prevent wide and sudden fluctuations in prices in so far as it could properly do so by its own course of conduct. Many witnesses testified to the benefit which had resulted to the trade from this policy, which was also highly beneficial to the public and clearly within the legal rights of a manufacturer. In spite of the steadying of the market, however, the general tendency of prices from the time of the organization of the corporation until the close of the testimony in this case was downward, both actually and as compared with the prices of other commodities, and it was a significant fact that at the time the bill against the so-called super-combination was filed a given amount of steel would buy less lumber, less food and less clothing than at any time in the history of the industry.

"What do you take as your standard in figuring that the price of steel since the corporation was formed is less than before?" asked Chief Justice White.

"We take the whole period of the existence of the corporation," replied Mr. Reed, "and average the prices and compare them with the average of a similar period of equal length immediately before. This shows a substantial decline and amply proves our contention in this regard."

Mr. Reed concluded with an emphatic declaration that the general policy of the Steel Corporation had proved of great benefit to the entire steel trade and had injured no one.

## Concluding Argument for Corporation

In concluding the argument for the Steel Corporation, Mr. Severance declared that the Government had abandoned one contention after another with regard to the organization of the Steel Corporation until its claim was finally reduced in effect to the charge that by reason of the possession of what is termed an "overwhelming preponderance" in the trade it has dominated it. The expression "preponderating share of the trade," Mr. Severance said, was used in the opinion of the District Court in the Cash Register case, the court holding that "it is sufficient that outsiders are substantially excluded so that the insiders have to themselves approximately, or largely preponderating part of, the whole field." It was thus obvious that the court meant that the combination possessed so large a part of the business as to substantially exclude competitors, which, of course, was not the case as to the Steel Corporation. The test as applied to the Cash Register case by the District Court was the only possible test that could be made and under it the Steel Corporation could not be held to have violated the law.

"There is no question that the Sherman act has clearly established, as has been well said by Mr. Justice McKenna in more than one opinion, that competition and not combination is the rule prescribed by the law. That competition has been free, fair and effective in the case of the Steel Corporation has been established by witnesses whose testimony fills 11 entire volumes of this large record. Nothing is alleged against the character of any one of these witnesses and nothing can be said against their information upon the subject."

During the so-called Gary dinner movement, Mr. Severance said, there was a variation in price between the corporation and its competitors. While the corporation reduced its prices two or three times during 1908 and made public announcement thereof, its competitors took its business by underselling these published prices. The Gary dinner movement, he said,

was the strongest evidence of the recognition by everyone of the corporation's lack of power to fix prices.

#### Without Power to Fix Prices

While the record was full of testimony showing that the corporation had not fixed prices in the past, but that there had always been active competition, Mr. Severance said he thought it was important in addition to know that the corporation had no power to regulate prices and hence that its existence was in no sense a menace to the steel trade. Freedom of commerce in the iron and steel industry, he declared, did not depend upon the life of Judge Gary or upon his personal influence in directing the policy of the corporation.

"In considering this matter," Mr. Severance said, "it is important to observe the difference between the manner in which steel is marketed and in which products of combinations such as the Standard Oil Company are marketed. It appeared in the Standard Oil case that oil was sold in various towns direct to consumers or small retailers, and a great organization could, of course, drive out of business a small retailer by selling below his costs and putting up prices after obtaining a monopoly, and this was repeatedly done. Steel products, however, are sold in quite another way. The market is general. They are disposed of to railroads and to large manufacturers direct. Outside of these large buyers, the remainder is mainly sold to wholesale merchants. These large manufacturers, in order to compete with their rivals, must buy their raw materials at an approximate parity of prices, and the wholesale merchants in the different states throughout the country meet the competition of wholesalers in their cities so that it is impossible to localize a steel war.

In conclusion, Mr. Severance described to the court the laborious efforts made by the corporation to build up its foreign trade in competition with the producers

of Germany, Belgium, France, and England. Mr. Farrell, who had previously had charge of the export business of the corporation, had established no less than 258 agencies in 50 foreign countries, equipping them with warehouses and sending out from the United States the ablest men to be found to take charge of the business. These agencies were forced into competition with foreign manufacturers, who were able to utilize well established steamship lines with regular sailings, and the corporation, in order to make any progress at all, was compelled to build a large fleet of vessels em-

ployed exclusively in distributing its product to its foreign agencies and large customers. From the outset the corporation found that its rivals had an important advantage in the banking facilities which they possessed, and the whole export movement in steel products from the United States was uphill work attended by great difficulties and requiring much energy and enterprise to push it. What the corporation has succeeded in accomplishing, Mr. Severance declared, was an extraordinary tribute to the enterprise and energy of the American business man.

## Conclusion for the Government

Solicitor General Davis, in making the closing argument for the Government, declared that the suit against the Steel Corporation had been brought in the belief that the decisions of the United States Supreme Court affirmatively establish that "a combination of

able competitors in any trade to cease competition among themselves and unite their exertions for a common profit is a violation of the Sherman law, when the restraining of trade therefrom arising is undue, and that the restraint of trade so arising is undue, as a matter of law, whenever the combined competitors together possess a preponderance or, if you choose, a dominant share of the trade; and in all those circumstances the degree of intent which moves the parties to that combination, or the conduct which follows it, are alike immaterial or alike are impotent to relieve them from the condemnation of the law, and, if material, are material only as cumulative evidence of the nature of their act." Mr. Davis added that he was perfectly willing to accept the further modification suggested by Mr. Lindabury that "even where the parties have not so combined to suppress competition in a dominant share or proportion of the field, but have suppressed it in some lesser area, their acts still

may be illegal upon a positive showing of an intent to violate the law, because the law is leveled not only at a completed monopoly, or at a universal restraint, but at any attempt to accomplish a restraint or a monopoly, and its preventative force may be invoked as well when the act is begun as when it has progressed to completion." Continuing, Mr. Davis said:

### The Essential Facts

"What are the utterly essential facts in this controversy? They can be stated historically, and it will be found that in reference to them there is practically no diversity of testimony. Here was a great industry that had grown up in this country. In a general way, it had localized itself geographically in the area bounded by the Ohio River on the south and the Great Lakes on the north, and a meridian drawn just east of Pittsburgh on the one hand and just west of Chicago on the other would have embraced practically the entire industry. East of that meridian it is true, there would have been such companies as the Pennsylvania Steel Company, with its plants at Steelton and Spar-

rows Point in Maryland, the Bethlehem Company at Bethlehem, the Cambria Steel Company at Johnstown, the Lackawanna Steel Company at Scranton, afterward removed to Buffalo; and west of it, across the

Mississippi River, the Colorado Fuel & Iron Company at Denver, and to the south, as the only factor worth consideration at the time of the organization of this company, the Tennessee Coal & Iron Company at Birmingham. But the rest of this industry had localized itself in a comparatively limited area. I think it is perfectly plain that it has done so because of its proximity there to the cardinal raw materials, coal and iron ore. Its ore supplies were the Lake Superior mines in upper Wisconsin, Michigan and Minnesota, and its coal the great Pittsburgh seam in Pennsylvania and the Illinois and Indiana deposits. Some 130 or 150 active, energetic, well-organized concerns were engaged in it."

"As many as that—130 or 150?" asked Chief Justice White.

"There were 130 taken into this single combination," replied Mr. Davis. "Competition was active, except for the effort among those competitors themselves to suppress it from time to time by voluntary agreement. In almost every line of the

trade the history was a pool formed to-day to divide the output and fix the price, and the breaking of that pool to-morrow and the formation of another in its stead. They went from pool to competition and from competition back to pool, but always with an effort to keep the pool side in the ascendancy. Those pools had certain inherent, visible human weaknesses."

### Handled by a Few Men

The most surprising thing about the history of these combinations and the "super-combination" itself, Mr. Davis said, was the meager handful of men by whom these consolidations were brought about.

"The two Moores, Reid, Leeds, and one or two others," he said, "busied themselves first with the tin-plate industry, and they brought together in December, 1898, practically all of the tin-plate plants of the United States, certainly all those that had any respectable standing in the tin-plate trade, and formed them into a single combination, controlling at the time of its organization 90 per cent of that trade. Capitalizing it at a sum \$36,000,000 in excess of the value of the

### An Amusing Incident Recalled

In the course of his argument, Solicitor General Davis said: "I remember a story told by the witness Stevenson as to the wire nail pool in 1896, which illustrates the reasons why pools were not entirely adequate for the purpose they had in mind. He says they met together, all the wire nail manufacturers, and before luncheon had agreed upon a price. When the luncheon hour was announced, he went out to wire that price to his partners at home, so that they might fix their contracts accordingly. One of his competitors went out from the meeting on the same errand, and the telegrapher made a mistake in handing back the copy of the telegram, and handed him not his own, but the one his competitor, a man named Baackes, had just sent. Whereas the pool had fixed the price at \$1.50 a keg, Mr. Baackes had gone out and wired home to his company to sell 100,000 kegs at \$1.40. Mr. Stevenson carried that copy of the Baackes telegram into the meeting, and when they reconvened he handed it to the chairman and invited him to read it to the meeting. The chairman did so, and closed the reading with the statement that he authorized Mr. Stevenson to take Mr. Baackes and kick him downstairs, but old Stevenson, being a canny Scotchman, closed the incident with the statement that Mr. Baackes was a larger man than he was."

subsidiary properties, and taking to themselves as their reward for so doing about \$11,000,000 of its stock, which was not mere worthless scraps of paper but certificates entitling them to practically one-fourth ownership in all the property, be its market value what it might.

"Now, if your honors please, if this case should stop there, can there be any question under the decisions of this court of the status of that organization? If, instead of being a tin-plate company, it had been what had theretofore existed, and the legality of which had already become doubtful in the minds of the participants, a tin-plate pool, can there be any question that it would have been a restraint of competition and a violation of the Sherman act, and that the court when called upon for that purpose would promptly have dissolved it and enjoined its reconstitution?"

Justice McKenna asked whether at the various conferences and dinners there was a distinct agreement to fix prices on particular articles and control the market.

"The court so held," replied Mr. Davis.

"But how about the record," insisted Justice McKenna. "The other judges held the other way, did they not?"

"Stated briefly, as I understand it," responded Mr. Davis, "the situation was this, that at these dinners the price was announced which the Steel Corporation proposed to charge. There was a general expression of approval and of a determination to adhere to that price, carefully avoiding, however, the words 'we agree' or 'we contract' to do so, but all parties leaving the dinner and leaving the meeting with the understanding that in honor and as a matter of morals, if not as a matter of legal sanction, they were bound absolutely to that price and were bound to give formal notice if they saw fit to abandon it. That, say Judges Woolley and Hunt, and that, says also Judge Buffington, is tantamount to an agreement to fix prices, and that character of sanction was just as powerful as the old sanction of a penalty that attended the former pools; and under those conditions it is not surprising that no competitor appeared here to complain, and that from the standpoint of the trade competitive conditions were truly ideal.

"But the Sherman law concerns itself not only with the attainment of satisfaction inside of the trade; it also considers the status of the consumer and holds him entitled to a price fixed as the result of genuine competition and not as the result of satisfactory agreements between the producer."

"Was there any wide struggle between competitors to extend their trade, keeping the agreement as to prices, but extending their sales?" asked Justice McKenna.

#### Concession by the Government

"I think so," replied Mr. Davis. "I think each one of them was endeavoring to extend his trade in the market, and so much we freely concede. They say that the market was not controlled; and, in the sense in which your honor suggests, perhaps it was not. Any producer had the right to approach any consumer he chose and to endeavor to secure his trade by such inducements as he might offer, aside from the reductions in price or competitive bidding. When it came to a contest of that sort, involving ability to furnish facilities for production, access to raw materials, there can be no question, I take it, under this record that the Steel Corporation in an enterprise of that character had more than an even start of any of these competitors. And that its control of prices was not purely—"

"Is there anything in the record to indicate that the trade was not extended by its competitors through inability on their part to furnish the trade?" again inquired Justice McKenna.

"So far as I know, no," replied the Solicitor General. "I recall no testimony of that specific character."

Continuing, Mr. Davis said that the theory of counsel for the Steel Corporation was that so long as one competitor remained in the field, it could be claimed that competitive conditions existed, and that therefore there could be no violation of the Sherman law until

the corporation complained of controlled 100 per cent of the industry.

"What I am struggling with, Mr. Solicitor General," interjected Justice McKenna, "is this: How can there be a competition between customers without a competition in temptation of customers?"

"They answered that," replied Mr. Davis, "by saying, as of course all of us know, that the chief temptation is price. Without temptation as to price, there is not very much to tempt a customer. But these gentlemen would say that temptation remains in quality of product, in promptitude of delivery and in terms of credit, and that those things were left open to any competitor. Of course, there is a certain extent to which that is true; but as compared with temptation in prices, why, all those other matters, of course, are insignificant."

"Yes," rejoined Justice McKenna, "but what comparison was there between the Steel Company and its so-called competitors as to these things that you mention?"

"The record does not disclose," replied Mr. Davis. "To my mind, it is inconceivable that the Steel Corporation, organized and advantaged as it was, could not have more than met any competitor in any one of these particulars."

"Yes," said Justice McKenna, "but you said that no competitor came forward because the prices were agreed on; and yet you concede that there may be other temptations to trade besides prices."

"I say no competitor came forward to complain. I do not say that there are no competitors left in the steel trade. We have never made that contention because it is transparent in the record that there are."

"But you also suggested that the reason why they did not complain was that the prices were fixed at those conferences," insisted Justice McKenna.

"Yes, sir."

"And now you admit there are some other temptations besides price."

"Yes, but those other temptations, if your honor please, could never be so controlling or so potent that they could destroy a competitor if directed against him."

Commenting upon Mr. Lindabury's appeal to the court not to penalize the Steel Corporation for efficiency at a time like the present, Mr. Davis said:

"The suggestion is made by Mr. Lindabury in closing, with special reference to existing conditions, that this is a time not for the disintegration of the industries of the country, but a time for their mobilization. That, if your honors please, seems to entirely mistake this case and to assume too much on behalf of counsel's client. This case is not an attack on the steel industry, in any sense. It is not conceived that if what the Government aims at in this case is brought about, the units that then remain will be any less efficient, any less serviceable, than the corporation in its combined form. On the contrary, taking the judgment of Congress on this question as the ultimate arbiter, this suit is aimed to restore to the industry a condition of healthful competition under which it will best flourish and under which it can best render such service as it may be called upon for; and if that occasion or emergency arises, those units, the Bethlehem Company, the Jones & Laughlin Company, and these other competitors, will no doubt be able to render their appropriate share."

#### The Remedy Sought

In conclusion, the Solicitor General took up the question of the remedy sought by the Government, which the court below had not discussed because of its finding in favor of the corporation.

"Had the court found in favor of the Government instead of against it," said he, "it is fair to assume that it would have adopted what has come to be an established practice in these cases and called on the parties to submit to it a plan for the restoration of competitive conditions. We deem it at this stage of the case unnecessary to enter into any such plan in detail, assuming that this court will do, if it should find for a reversal, what the court below would do, and

postpone that consideration. The court below did make this suggestion, and I want to notice it in passing: it suggested that notwithstanding its unwillingness to find them for the Government, it would, if the Government so requested, retain the case upon the docket, to the end that if there should be a subsequent disturbance of competition, if the evils which the Government suggested should thereafter arise, it would still have the case before it and might proceed to a decree upon such showing, by supplemental bill or otherwise, as the Government might deem proper. The Government rejected that contention.

"Speaking for myself, I have a profound conviction against either the power or the policy of such a decree. I cannot conceive that the courts of equity of this country can take in perpetual wardship any industries of the country or any other litigants simply because they have appeared before it. The primary duty of the court is to decide upon the issue presented at the time of the submission and award the parties relief as the evidence discloses; and if, when an anti-trust case is brought, the facts not being sufficient to afford relief, the defendant on the one hand and the Government on the other are to be confided in perpetuity to the court, courts will assume a burden which will ultimately destroy all their usefulness. We rejected that contention, treating it, if your honors please, as parallel with the suspension of sentence in criminal cases recently passed upon by this court.

"Now, as to the form which the remedy should ultimately take: The first step, we think, is perfectly clear that this holding company should be required to release its hold upon the constituent corporations, all of which, as I pointed out, still survive in integral form, fully officered and fully manned; and that, for the further restoration of competitive conditions in the industry, those corporations should be so readjusted, either by an allocation of plants or by an assignment of assets one to another; that there should arise from this amalgamation a sufficient number of fully integrated competitive units, to possess, each one, entire efficiency, and none the power to threaten monopoly in the steel industry; and it is to such a decree, if your honors please, that the effort of the Government in this case is directed."

W. L. C.

### Magnesite Deposit in Washington

The American Mineral Production Company, through its sales representatives, H. H. Brunt & Co., 662 Insurance Exchange Building, Chicago, has begun to market crude magnesite of a coarsely crystalline character, said to be similar to the standard Austrian magnesite, from a large deposit located about 50 miles north and west of Spokane, Wash. The company has let contracts to the Schaeffer Company, Tiffin, Ohio, for a calcining plant and, pending the erection and completion of this equipment, is preparing the deposit to be worked on a large scale. Shipments of the crude magnesite thus far, for refractory purposes, have been limited to trial cars, but the company is submitting samples of its product to those desirous of acquainting themselves with the quality of the mineral. An average analysis of the magnesite shows: silica 0.8 per cent, alumina 0.4 per cent, iron oxide 2.7 per cent, lime 3.3 per cent, magnesium carbonate 92.1 per cent.

While the nearest railroad is now several miles from the property, the company anticipates the early provision of shipping facilities commensurate with its production. It is the company's expectation to be able to compete with imported magnesite at a normal level of prices.

A building devoted to the comfort and convenience of its employees and to the safeguarding of their health has been erected by the American Pulley Company, Philadelphia. It is a two and three story brick structure, centrally located, easily accessible from all sides. The first floor is devoted to first aid and health supervision. On the second floor are lockers and shower baths. The third floor is only half size and is entirely a covered recreation and rest room, the remainder of the area being an open-air promenade.

### American Radiator's Best Year

The eighteenth annual report of the American Radiator Company for the fiscal year ended Jan. 31, 1917, shows net profits of \$2,604,068, compared with \$2,364,953 the previous year. Following is the income account for these two years:

	1916-17	1915-16
Net profits .....	\$2,604,068	\$2,364,953
Preferred dividends .....	210,000	210,000
Balance .....	2,394,068	2,154,953
Common dividends .....	1,309,696	1,309,696
Surplus .....	1,084,372	845,257
Previous surplus .....	7,972,842	7,127,585
Total surplus .....	\$9,057,214	\$7,972,842

The balance sheet as of Jan. 31, 1917, shows net quick assets of \$7,880,384, as compared with \$7,180,320 the previous year. The company has no bonded debt. The net profit shown in the first annual report for the year ended Jan. 31, 1900, was \$657,161. The million-dollar profit mark was first passed in 1910, the two-million mark in 1913. The following extracts are taken from the accompanying remarks of President Clarence M. Woolley:

"During the year the market price of pig iron and other materials entering into the fabrication of our products increased about 75 per cent. The supply of labor was limited, and its efficiency, due to general conditions, was considerably lowered. The cost of production steadily increased throughout the year, which increased cost is a continuing feature of the situation. As the cost of production increased and the market price of materials advanced, selling prices were adjusted from time to time in order to maintain a consistent relationship with the underlying conditions affecting values and costs. The average price obtained on a somewhat increased volume of sales for the year enabled it to participate in the upward trend of values, and, therefore, the resultant profits were the largest of record.

"The financial condition of the company is satisfactory. At the close of the fiscal year, Jan. 31, 1917, all current indebtedness except that incident to the purchase of supplies and materials for the month of January had been paid, while the cash on hand amounted to \$2,997,408. The aggregate value of the tangible assets of the company and its constituent companies, including reserves, at the close of the last fiscal year, was \$28,925,449. The net profits of the entire business were, therefore, equal to 12.12 per cent of the said tangible assets.

"The business and profits of our foreign constituent companies as a whole during the past year were greatly increased over those of 1915. No dividends have been declared by any of the foreign companies since their establishment, the entire profits having been utilized for operation and expansion. For this reason their income has not been included in the balance sheets of this company. The net profits of the parent company for the fiscal year ended Jan. 31, 1917, were \$2,604,068. The aggregate net profits of the constituent companies for that fiscal year were \$901,500. The combined net profits were \$3,505,568. The surplus of the parent company as of Jan. 31, 1917, was \$9,057,215. The aggregate surpluses of the constituent companies were \$7,600,532. The combined surpluses were, therefore, \$16,657,747."

At their annual meeting held March 7 at East Orange, N. J., the stockholders ratified the action of the directors recommending an increase of the common stock from \$9,000,000 to \$22,000,000. The present issued common stock amounts to \$8,185,600, and of the increase authorized the sum of \$4,092,800 will be issued March 15 as a 50 per cent stock dividend. A regular quarterly dividend of 3 per cent will be paid on the common on March 31, and will apply on the increased issue. The quarterly dividend rate has been 4 per cent.

The Lindsay arsenal plant of the Canadian Government being built and equipped by Westinghouse Church Kerr & Co., according to their own plans covering buildings, power, machinery and special equipment, is to have a capacity of 300,000 0.303-in. rifle cartridges every 10-hr. day. A hundred acres of unimproved farm land in Lindsay, Ont., was taken for the plant.

# An Investigation of Deoxidizers for Steel\*

Relative Value as Regards Their Influence  
on Density, Soundness, Piping, Segregation  
and on Static and Dynamic Properties

BY H. M. BOYLSTON

**I**N the first part of this report the author described the results of adding various deoxidizing agents in different proportions to raw converter metal. The present report includes the description of a similar experiment with the exception that in this case steel with about 0.50 per cent carbon was used instead of converter metal, and only one proportion of deoxidizer was used in each case, namely, the proportion found by Experiment 1 to give the soundest ingot when added to raw converter metal.

Enough ferromanganese and ferrosilicon were used to bring the manganese and silicon content up to the requirements. The various deoxidizers under test were then added in the proportion, determined in Experiment 1, which gave the soundest ingots when added to raw converter metal.

Steel was made in the usual way by blowing cupola iron in the Tropenas converter, adding to it the required amount of cupola metal for recarburizing, and teeming the mixture into a preheated 2-ton

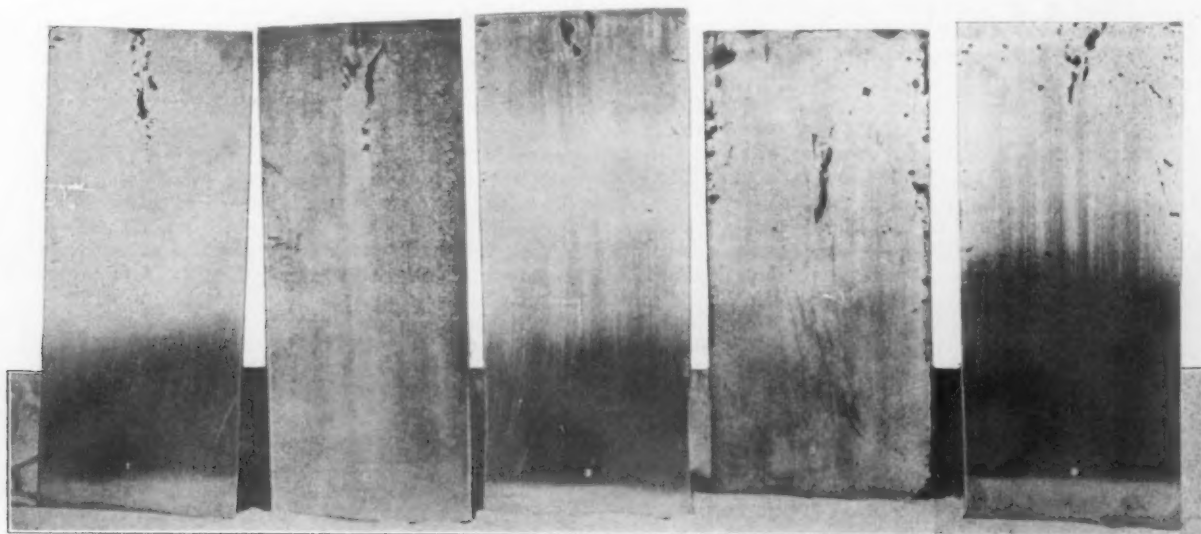


Fig. 1—Ingots 1, 2 and 3 Are From Steel Made with 0.10 Per Cent Titanium in the Form of 15 Per Cent Ferro-Carbon Titanium, in Vertical Sections, and About One-Fifth Actual Size. Ingot 2 is etched with iodine. Ingots 5 and 6 are from steel made with about 0.50 per cent manganese in form of 80 per cent ferromanganese. They are vertical sections, about one-fifth actual size. Ingot 5 is etched with iodine.

The proportions of deoxidizing element aimed at in Experiment 2 were as follows:

	Per Cent
Titanium (FeTi) .....	0.1
Manganese (FeMn) .....	0.5
Titanium (FeTi) .....	0.1
Silicon (FeSi) .....	0.4
Aluminum (Al) .....	0.2

The same stock of deoxidizing material was used in Experiment 2 in each case as was used in Experiment 1. The results as reported here are known as Experiment 2, and complete physical and some chemical tests were made on all the ingots.

## Material Used and Procedure

One heat of metal from a Tropenas converter was used, the aim being to obtain steel of the following composition:

	Per Cent
Carbon .....	0.40
Manganese .....	0.50
Silicon .....	0.20
Phosphorus .....	0.05
Sulphur .....	0.05

Cupola metal of the same analysis as used for the heat of steel was added as a recarburizer.

\*From the second part of a paper awarded a Carnegie Scholarship Memoir by the Iron and Steel Institute in 1916. The abstract of the first part was published in THE IRON AGE March 8, 1917. The author is associated with Prof. Albert Sauveur as Sauveur & Boylston, Cambridge, Mass.

ladle in which had been weighed the correct proportions of ferromanganese and ferrosilicon to give the analysis desired.

The metal in the 2-ton ladle was carried to preheated ladles, each of the capacity of 1000 lb., three of these ladles being used. These 1000-lb. ladles had been weighed, and approximately 1000 lb. of metal was teemed into each, and weighed. The first and second 1000-lb. ladles were used for the fourth and fifth sets of deoxidizers.

Fifteen ingots in all were poured, three with each addition. All the deoxidizing additions were made in the ladle, since it was determined from Experiment 1 that aluminum added in the mold did not give as good results as aluminum added in the ladle.

In addition to the above there was cast a small ingot of raw converter metal (Ingot 17), and one of converter metal to which the carbon, manganese, and silicon additions had been made, but to which no deoxidizer considered as such had been added (Ingot 18). Ingots 4 and 10 were small because there was not enough metal left in the 1000-lb. ladle to fill the mold. These two ingots were, therefore, not tested.

The deoxidized metal was held from two to three minutes in the ladle before pouring into the molds.

### Homogeneity and Piping

All ingots were cast from one heat, and manganese and silicon additions were added to the entire bulk of steel, so that the steel was as homogeneous as possible. Each 1000-lb. ladle gave enough metal for three ingots and the deoxidizer was added in these ladles, so that the homogeneity of the steel with any given deoxidizing addition was also as homogeneous as possible. The deoxidizer was added to the 1000-lb. ladle while the steel was being poured into it, the first portion of deoxidizer going in when the ladle was about half full, and the additions being completed just before the last portion of steel was poured from the 2-ton ladle. This allowed a thorough mixing of the deoxidizer with the metal.

Ingots were made as large as possible, keeping in mind that one heat of metal was to be used for the entire set. The pattern for the mold was made about 25 in. long and  $7\frac{1}{4}$  by  $7\frac{3}{4}$  in. in diameter at the respective ends, the mold being slightly tapered for draft, with the larger end up. The ingots

bontitanium; ferrosilicon; aluminum; ferromanganese; carbon-free ferrotitanium. The hidden pipe in Ingot 8 (carbon-free ferrotitanium) is especially noticeable. No evidence of this pipe was visible on the transverse section at the cropping point. Blowholes are plainly visible in Ingots 3 (ferrocabontitanium) and 5 and 6 (ferromanganese). Ingot 5 (ferromanganese) also has a hidden pipe.

(The author gives details of the methods of measuring the density and specific gravity of the metal in each case.)

### Annealing and Physical Tests

Pieces were cut from the upper half of each half ingot, the pieces being about 2 in. square and about 7 in. long. These were heated in a semi-muffle type oil-fired shop furnace to 850 deg. C., held for one hour, and cooled in air. All 13 pieces were removed from the furnace within two minutes, so that the rate of cooling of all of them was practically the same. These pieces, together with pieces of about

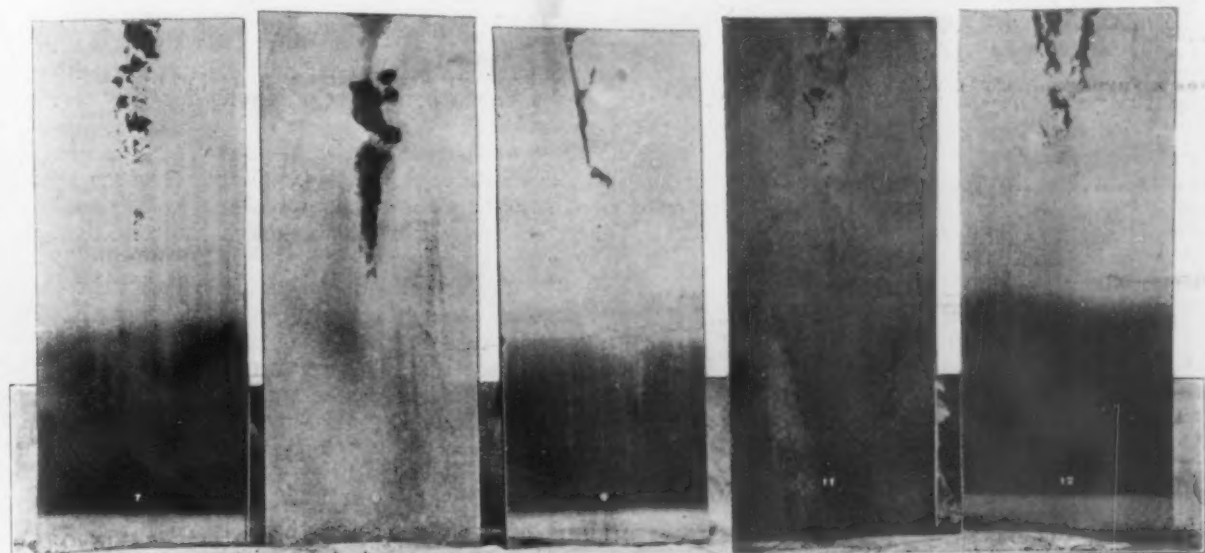


Fig. 2—Ingots 7, 8 and 9 Are From Steel Made with 0.10 Per Cent Titanium in the Form of 25 Per Cent Carbon-Free Ferrotitanium in Vertical Sections and About One-Fifth Actual Size. No. 8 is etched with iodine. Ingots 11 and 12 are from steel made with about 0.40 per cent silicon in the form of 50 per cent ferrosilicon. Ingot 11 is etched with iodine

weighed from 179 to 222 lb. each, with the exception of Ingots 4 and 10, which were discarded. Ingots 17 and 18 were intended to be the same size as the others, but there was not enough metal left.

All the ingots were sandblasted, and all but the four referred to were cropped to 20 per cent of their length. Each ingot was then split vertically, and five representative ones were etched with a saturated solution of iodine in 95 per cent alcohol to bring out differences in the microscopic structure due to segregation. All of these ingots were photographed and are shown by the illustrations

No special precautions were taken to prevent piping by mechanical means. This was intentional, as, at the time the plans were made, it was thought better not to confuse the effect of mechanical and chemical methods on the formation of pipe since the prevention of piping as such was not to be studied. It is now believed that it would have been better to reduce or eliminate the pipe by mechanical means, as any effect of the chemical additions (deoxidizers) on the piping would thus have been more clearly shown. As a matter of fact all of the ingots were piped more or less for a considerable distance below the point of cropping. The value of the different deoxidizers as given in terms of the pipe in these cropped ingots would be: Ferrocab-

ontitanium; ferrosilicon; aluminum; ferromanganese; carbon-free ferrotitanium. The hidden pipe in Ingot 8 (carbon-free ferrotitanium) is especially noticeable. No evidence of this pipe was visible on the transverse section at the cropping point. Blowholes are plainly visible in Ingots 3 (ferrocabontitanium) and 5 and 6 (ferromanganese). Ingot 5 (ferromanganese) also has a hidden pipe.

The bars from the forged metal were chosen as follows: Three inches were discarded from the end of the bar representing the upper end of the lower half-ingot. A piece long enough for one tensile and four Charpy test-pieces was then cut off and annealed as described above.

Tensile test-pieces and Charpy impact test-pieces were cut from the annealed material and subjected to tensile and Charpy impact tests respectively. In the tensile and Charpy tests the differences between the averages of the various groups of ingots are often less than the differences between many of the physical properties in the same group, the term "group" being understood to include the two or three ingots cast with the same deoxidizer.

Carbon determinations were made in duplicate by the direct combustion process from five of the ingots. In Ingot No. 1, made with ferrocabontitanium, the tests have not brought out any segregation of carbon; in fact there may be said to be a slight negative segregation. The same thing is true of Ingot No. 6, made with ferromanganese addition, in which the carbon at the bottom of the pipe is

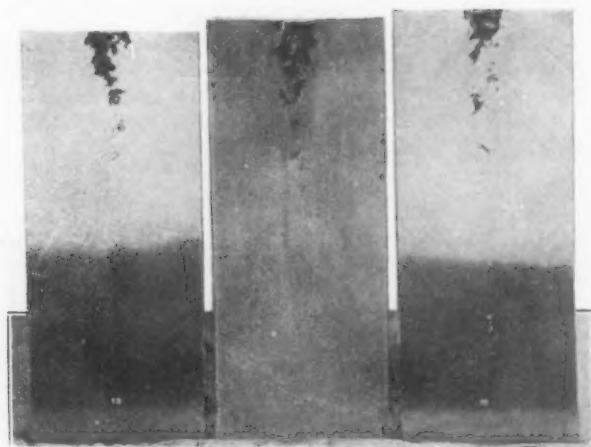


Fig. 3—Ingots 13, 14 and 15 Are From Steel Made with About 0.15 Per Cent Aluminum in the Form of 99 Per Cent Granulated Aluminum, in Vertical Section, and about one-fifth actual size. Ingot 14 is etched with iodine

0.372 per cent, while at the corresponding point on the outside of the ingot the carbon is 0.403 per cent. The same remarks apply also in general to Ingot No. 9, made with carbon-free ferrotitanium. In Ingot No. 12, made with ferrosilicon, there is a slight segregation of carbon at the bottom of the pipe. In Ingot No. 15, made with aluminum, there is also a distinct positive segregation, the carbon at the lower end of the pipe being 0.528 per cent., while the carbon at the corresponding point on the outside of the ingot is 0.396 per cent.

(A large portion of the original discussion is devoted to the question of gases in the steels and their extraction *in vacuo*. Thomas Baker's results are gone into fully. Mr. Boyleston gives his method of determining these and the results.)

#### Discussion of the Results

The preliminary experiments indicate the possibility of better results being obtained from adding the deoxidizer to the raw converter metal before recarburization. This is a radical change from common practice, but the indications are plain that such a method might lead to valuable results.

The results of Experiment 1, where no recarburizer was added, show a distinct difference in the effect of the different deoxidizers and also a difference in the various proportions of the same deoxidizer.

It is not entirely certain that the best proportion of each deoxidizer was used in Experiment 2, but some limit had to be drawn as to the number of proportions tried in Experiment 1. In the cases of the titaniums the proportion used was that recommended by the manufacturers in addition to being the proportion given the soundest ingots in Experiment 1, while the proportion of aluminum (0.14 per cent, or about 45 ounces per ton of steel) is about one and a half times as much as the largest percentage of aluminum recommended by the manufacturer, although 0.2 per cent aluminum, which was the amount aimed for in Experiment 2, gave an average relative density of over 7.93. For silicon and manganese no recommendations could be obtained from the manufacturers, and proportions recommended by various metallurgists were used in Experiment 1, and the proportion giving the soundest ingots in that experiment was used in Experiment 2.

As in the preliminary experiments, the raw converter metal was comparatively free from blowholes. All of the ingots in Experiment 2 except 17 and 18 were much sounder than those in Experiment 1, as might have been expected.

**Density.**—Both the density and the specific gravity tests were rather disappointing. To obtain good results in measurements of density it is believed that ingots must be weighed, either with the pipe left open or after cropping off the piped portion. In experiments like the present one, specific gravity tests from small specimens, unless taken from many places in the same ingot and averaged, are of little value.

**Tensile Tests.**—The order of the deoxidizer as regards tensile strength is exactly the same whether taken from the annealed cast metal or the annealed forged metal, although of course the actual strength figures are much higher in the forged material than in the cast condition. The elongation figures do not check so well, but again, as would be expected, those for the forged are much superior to those of the cast metal.

**Impact Tests.**—The annealed forged steel is also much more resistant to impact shocks than the annealed cast steel, but the relative order of the deoxidizers as regards the Charpy tests is almost diametrically opposite in the cast and forged material.

**Segregation.**—There is little doubt as to the proper order of the deoxidizer as regards its influence on carbon segregation so far as these tests went.

**Gas Extraction Tests.**—Baker's results showing a large difference between the gases given off from steel with and without aluminum were not checked in these experiments, although the conditions were somewhat different.

It is not entirely clear what relation the gas extraction tests bear to the present research. They form a valuable record as far as they go, but it is not clear that the steel which gives off the most gases in such a gas test as this is necessarily the most sound or the most unsound material. Practically all of the gas test-pieces in this experiment were sound on the outside at least, and the identical pieces used for the specific gravity tests were used in the gas tests, yet there is no direct relation shown between these two tests; for instance, the ingots cast with ferrotitanium carbon-free gave the highest average specific gravity, while the samples with ferromanganese and aluminum additions both gave out more gases.

There are two cases where deoxidizers might affect the evolution of gases: (1) in the molten steel, and (2) in the steel during solidification. An ideal deoxidizer presumably would be one which would allow the maximum amount of gases to be given off from the molten steel while preventing such gases as remained in the steel from being given off during solidification. It is not clear that the tests which have been made are a measure of the influence of the deoxidizers in either of the above cases, for they give no information as to the relative amount of gases evolved from the molten steel and from the steel during solidification. The tests do show, however, that some of the deoxidizers, notably ferromanganese and aluminum, favor the retention in solid solution of such gases as remain in the steel after it has begun to solidify.

**Microscopic Examination.**—Preliminary microscopic examination was made from the tensile test specimens, which showed a considerable amount of slag present, as might have been expected from the small size of ingot used, and because no special precautions were taken in pouring to keep the slag out of the mold. The irregularity of the slag has doubtless affected the physical properties, and a great many more physical tests should be made from these ingots if valuable conclusions are to be drawn from

them. It is hoped to make further microscopic examination with a view to throwing more light on the irregularity of the physical tests in Experiment 2.

**Cost of Deoxidizers.**—The question of cost is of vital interest to the manufacturer. The following table shows the relative cost of the deoxidizers per ton of steel. The normal price of the deoxidizers rather than the war price is used, although the author realizes that prices of ferromanganese and aluminum have been tripled.

Calculation of Cost of Deoxidizers per Ton of Steel, Based on Experiment 2

Deoxidizer	Ounces Deoxidizer Used Per Ton of Steel	Normal Price of Deoxidizer	Cost of Deoxi- dizer Per Ton of Steel
Ferro-carbon titanium...	212	\$0.10 per lb.	\$1.33
Ferromanganese .....	198	39.65 per ton	0.25
Ferrotitanium (carbon free) .....	125	0.30 per lb.	2.31
Ferrosilicon .....	229	71.12 per ton	0.51
Aluminum .....	46	0.19 per lb.	0.55

Conclusions

It was not to be expected that any very startling difference would be noticed in the action of the deoxidizers tested. If there were such a difference, it is reasonable to suppose that manufacturers would be more unanimous in choosing one or more of them to the exclusion of the others.

The evidence obtained in these experiments, either on account of the small number of tests or because of experimental difficulties, is not conclusive, but the results of the various tests are collected below in a table, and give a graphic idea of the influence of the deoxidizers tested. Their relative merits, however, depend so much on just what is sought in the steel that each manufacturer must decide for himself which deoxidizer will best suit his needs.

Table of the Relative Order of Deoxidizers as Regards Their Various Influences

Order of Deoxidizer with Regard to Influence on	FeCtI.	FeMn.	Carbon- free	FeSi.	Al.
Density .....	1	5	2	4	3
Specific gravity .....	2 1/2	4	1	5	2 1/2
Soundness .....	4	5	3	2	1
Piping .....	1	4	5	2	3
Tensile strength, cast condition	2	3	4	1	5
Elongation, cast condition....	1	3	5	2	4
Tensile strength, forged condi- tion .....	2	3	4	1	5
Elongation, forged condition...	4	5	2	3	1
Charpy test, cast condition...	2	3	5	1	4
Charpy test, forged condition...	5	3	2	4	1
Carbon segregation .....	2	1	3	5	4
Cost of deoxidizer per ton of steel .....	4	1	5	2	3

The author realizes that although the amount of work done in these experiments was great, there is still more to be performed. With the data in hand the question of the relative merits of these deoxidizers cannot be definitely decided. He hopes, however, that this collection of data will be useful as far as they go, and that it will inspire others to continue investigations along the same lines, preferably with larger ingots.

The Industrial Commission of Wisconsin has issued a report which shows a remarkable increase in the number of apprenticeship contracts. There are at present in force 969 legally executed contracts, compared with 468 a year ago, 163 in 1915, and 220 in 1914. Of the 969 apprentices 744 are in Milwaukee, and 566 of this number are engaged in the machinists' trade, while 121 are learning pattern making. The average wage received the first year is 12 to 13c. per hour; second year, 14 to 15c.; third year, 16 to 17c., and fourth year, 20c.

STATUS OF ENEMY ALIENS

To What Extent Treaties Protect Property Rights of Foreigners in Case of War

The property rights, individual and corporate, of enemy aliens were discussed in the February issue of *The Americas*, a publication of the National City Bank, New York, by Edwin M. Borchard, formerly of the State Department and author of "Diplomatic Protection of Citizens Abroad." He said in part as follows:

In the case of merchants and commercial houses of an enemy state, the United States has concluded treaties with most of the important foreign countries granting a limited period of time, from six months to a year, for the liquidation of their business and the removal of their property. In the case of persons engaged in peaceful occupations, such as farmers, mechanics, artisans, scholars, provision is usually made for their unmolested residence.

Until England found it expedient in this war to depart from and extend the old established rules of Anglo-American law, the test of enemy character under that law for purposes of trading and maritime capture was not the nationality of the owner of the vessel or cargo, the continental rule which she has now adopted, but the trade domicile of the owner; that is to say, the country in which business was carried on furnished the test of enemy character and not the nationality of the owners of the business.

All contracts entered into after the outbreak of the war are void and incapable of enforcement at any time. Those concluded before the war are not void, but their enforcement is suspended until the conclusion of peace.

Operation of Patent Grants

In the matter of patent rights, amelioration is desirable. There is no reason why war should cancel or even suspend valuable patent rights owned by citizens of one belligerent party in the country of the other. Yet, under existing practice the enjoyment of such rights is usually suspended and the owners' consent not asked for the transfer of the right of manufacture under the patent to others, on conditions of various kinds—either collection of royalties, arbitrarily fixed, for the benefit of the true owner, or perhaps the reservation of the owners' right to sue for damages after the war. It would be wise foresight and justice, Mr. Borchard holds, to agree by treaty to preserve patent rights, in time of war as in time of peace, prohibiting their being declared void; nor should their exercise be interfered with or transferred without the owners' consent, subject to their use by the State for public purposes, under appropriate compensation.

Existing commercial partnerships between nationals of enemy states are dissolved by the outbreak of war. Whether the same rule applies to alien enemy stockholders in corporations appears more doubtful. According to one view, believed to be the better one, the stockholders' rights and obligations are suspended until the restoration of peace; according to another these stockholders drop out and have a right to receive the value of their respective shares as on the day of the outbreak of the war. The obligation of a State to pay its public debt is not affected by the war, even though its bonds are held by subjects of the enemy.

The property of the citizens of an enemy found within the belligerent's own territory may in strict law be confiscated. Modern practice, however, has practically abrogated this rule and substituted the more humane principle that such property is inviolable. Treaties have confirmed this principle. Most of the treaties of the United States with foreign powers provide not only for exemption from military service or contributions in lieu of such service, but also for exemption from forced loans or military exactions. Where the property of enemy individuals appears likely to be of service to the enemy in his military operations, for example, ships in certain cases, arms and ammunition, it may be sequestered to prevent its reaching him and be restored at the end of the war, and it is always subject to eminent domain on payment of compensation.

No. 97 Year 19

**PROFIT SHARING  
CERTIFICATE**

To John Doe  
Badge No. 100

Your wages for the year 19 15 amounted to \$1,200.00  
Ten per cent (10%) of this sum is your certificate amount  
for 19 15. Your certificate is therefore for \$120.00 and you  
will hereafter receive the same rate of dividend on the amount  
of this certificate as you will receive on your yearly wages.  
Your previous certificates are shown in right column.  
The dividend rate for 19 15 is 12 % Your dividend is  
therefore \$192.60 for which we hand you herewith our check.

Certificate for 19 15 \$120.00 THE HYDRAULIC PRESSED STEEL CO.

*J. H. Foster*  
Vice President

Certificate	1907	*
"	1908	
"	1909	
"	1910	
"	1911	90.00
"	1912	100.00
"	1913	105.00
"	1914	110.00
"	1915	
"	1916	
"	1917	
"	1918	
"	1919	
"	1920	
Wages for 19 <u>15</u>		1200.00
Total		1605.00
Dividend	12	192.60

At the End of the Year Each Member of the Organization Entitled to a Share in the Profits Receives a Certificate Showing the Total Amount on Which He Can Draw Dividends

## Foremen, Not Sub-Employees, Share Profit

Unique System Employed at Plant of Hydraulic  
Pressed Steel Company — Works Divided  
Into Numerous Small Manufacturing Units

**A**N interesting plan of organization involving an unusual profit sharing system and the division of its plant into numerous small manufacturing units under unit bosses with a view to securing greater efficiency is employed by the Hydraulic Pressed Steel Company, Cleveland. It is stated that excellent results have followed its use, although the arrangement has been in effect only a little more than a year. In devising the scheme the company felt that something more than fair wages was due the members of the organization and the plan is designed to recognize the obligations that are due to all persons identified with the company from the owners or stockholders down to the dependents or families of those whose entire activity is given to the company. The keynote of the system is found in the statement of J. H. Foster, vice-president and general manager, that "if the management is to get from each what it has a right to expect, it must give to each a proper return. In proportion that each serves each must be compensated."

The first step in the evolution that resulted in the present plan of organization was the division of all the members of the complete organization into five classes as follows: (1) Owners, (2) Managers, (3) Operators, as the unit bosses are called, (4) Employees and (5) Dependents. The next step was the determination of the company's obligations to those included in each class. The owners who brought the company into being should be given a proper return for the use of the money invested. The managers, operators and employees should be given just wages for their services and opportunity for advancement, and proper facilities and conditions for performing work provided and maintained. Extra service and interest should be recognized by a

share in the profits. Dependents should be protected against loss of income because of death or disability of those who give their entire service to the company.

The obligation to the owners is cared for by setting aside from the profits a sum for distribution or addition to the surplus and not subject to participation by profit sharers. The obligation to dependents is to be taken care of by some form of disability insurance and old-age pension, this system not yet having been worked out. The obligation to those who serve actively was the most difficult to determine because the problem involved the question "Shall profit sharing include every employee, or shall there be a line drawn between those who share profits and those who do not share profits? And, if so, where shall the line be drawn?" It was decided that a line of distinction should be drawn so that profit sharing would be extended to managers and operators, or unit bosses, but not to employees. The distinction is most interesting and the decision to draw this line and where to draw it was the subject of deep study and is, perhaps, the kernel of the whole scheme.

An explanation of the form of organization is necessary to understand the reasoning that governed the decision in making the distinction between the operators who are profit sharers and the employees who are not. The executives and their assistants are the managers of the business and compose what is known as the senior organization. There is also a junior organization, whose members, known as the operators, include the department heads, foremen, responsible clerks and unit bosses. The profit sharing line is drawn under the unit boss. He is a profit sharer, but the employee under him is not.

The latter is recompensed directly for what he does, which includes extra pay for extra effort and he has the opportunity of earning promotion to a position as unit boss. An employee becomes a unit boss or operator when he has earned and has been given the responsibility and authority over a shop unit so that he can control those things within his unit that affect profits. A unit boss shares in profits because he helps make them. He is directly responsible for the profits earned and the costs expended within the boundaries of his unit.

#### The Unit System and How It Works

The plant units are marked off by a white cement line inlaid in the floor. This unit of floor space may contain one or more machines or may be devoted to some operation not requiring machinery. The units are arranged as far as possible on a productive basis to secure the greatest efficiency of the equipment. When the plant is completely organized under the new system it will have about 200 of these units. Each unit has a unit boss for each of the three shifts. Some units have 12 to 15 employees and others only four or five. The name of the unit boss for each shift is posted conspicuously with a notice from the management to the effect that the bosses are in complete authority within the confines of the unit.

As an example to illustrate the operations of the unit, one may be considered that contains a blanking press working three 8-hr. shifts and manned by six workmen for each shift. The operators of that press, one for each shift, having proved themselves worthy of the responsibility, are given complete authority over the other five men, known as employees, within the unit. Suppose that John Smith is boss of this unit for the morning shift. He confers at starting time with the unit boss just leaving to ascertain what difficulties have been encountered and how they have been overcome and what little tricks have been learned overnight to turn out the product more rapidly and secure better quality or to reduce the cost of production. Smith and the night unit boss are vitally interested in their work because the quantity, quality and cost of production directly affect the amount of the profits to be divided and Smith keeps his eyes, ears and mind lively during his 8 hr. to develop further schemes to increase

profits. He is careful of his machinery to the end that he may have no costly repairs and delays. He is economical in his use of supplies and conservative of raw material. If he can get five blanks out of a sheet instead of four by a little extra effort he will most assuredly get them. He does not allow his press to turn out defective material because a share of the cost of scrapping it later comes out of his pocket by reducing the amount of the profits or pool to be divided just as a share of the profits he earns goes into his pocket. He learns to realize that dirt and disorder hinder him in his productive work, so he sees that the other five men help in keeping the unit clean.

Smith goes through his 8-hr. turn with full authority over these five men, with power to discharge and recommend for employment and with the knowledge that all profits earned and expenses involved are first tabulated against his name on the factory manager's chart and, later, charged against or credited to the pool from which his share of the profits must come. If his foreman is displeased with the work of one of the other five men, he refers the matter for action to John Smith, the unit boss, except in cases of extreme emergency.

The unit boss knows that his services will be retained regardless of business conditions, so that he is guaranteed an income. But this does not mean that he will not be replaced if he fails to make good the trust placed in him. The factory manager will remove him if the tabulations on the daily chart show that the unit boss is not getting results. On the other hand, every possible opportunity is given him to make good. The company's welfare department conducts a school for teaching the English language to overcome the handicap of uneducated workmen of foreign birth. Tuition for night courses at a technical high school is paid by the company. In addition to these courses special localized education in management and work in his own department is given to John Smith, the unit boss, individually by the factory manager weekly or semi-weekly.

#### The Profit-Sharing System

The profits set aside for participation by profit sharers are divided into two portions. One is distributed among the managers who are members of the senior organization; the other goes to form



The Plant Is Divided into Numerous Units Each Marked Off by White Lines in the Floor and Having the Names of the Bosses Posted in a Conspicuous Place

a pool for John Smith and other bosses along with the foremen, department heads and responsible clerks, who are members of the junior organization. At the end of each year each member of this organization receives a certificate stating the total amount on which he is entitled to draw dividends. This amount is equal to his wages or salary for the year completed, plus 10 per cent of his wages for each year of continuous service with the company. This system provides a recognition for long service owing to the fact that the profit sharer draws dividends on 10 per cent of a year's wages more than he did the previous year. The percentage of dividends is arranged so that the amount of the total pool equals the amount to be divided. John Smith, therefore, receives quite a substantial amount each year in return for the extra effort he has expended and the extra thinking he has brought to bear on the work done in his unit.

Suppose that his wages for 1916 were \$1,500 and that his wages for the four previous years were \$900, \$1,000, \$1,100 and \$1,200 respectively. His profit sharing certificate amounts of 10 per cent for each of his previous years will equal the sum of \$90, \$100, \$110 and \$120, or \$420 in all. This amount is added to the \$1,500 wages for 1916 and the total amount on which he draws dividends is therefore \$1,500 plus \$420, or \$1,920. If John Smith and his fellow members have earned an extra profit that will enable the pool to pay a 20 per cent dividend, he will draw 20 per cent of \$1,920, or \$384. While this is quite a substantial sum to be paid to a boss as a share in the profits, it is stated that 20 per cent is by no means the limit and it is quite within the bounds of reason to expect John Smith and other bosses to create sufficient funds for the pool to pay a much larger dividend than 20 per cent.

#### Yale & Towne Earnings in 1916

The Yale & Towne Mfg. Company reports for the year ended Dec. 31, 1916, net earnings of \$3,386,426, a gain over 1915 of more than 61 per cent. After paying dividends, and allowing \$662,579 for depreciation, there remains for the surplus \$1,210,308, swelling the total reserve to more than \$7,200,000. The report says in part:

"The volume of business in the normal products of the company has been unprecedentedly large throughout the year and has taxed producing facilities to the utmost, the increase of output being distributed with substantial uniformity among its several lines of product. Business of furnishing certain special materials to European governments was conducted throughout the year on a larger basis than during 1915, and is continuing on a somewhat reduced scale. The export business as a whole has been the largest in the company's history and has yielded satisfactory profits notwithstanding the handicaps experienced in the way of embargoes, scarcity of shipping facilities and the entire loss of certain Continental European markets due to the war."

#### Automatic Pole Transformer for Plant Yards

For use at points distant from the power station in connection with series lighting systems, the General Electric Company, Schenectady, has brought out a new type of transformer. The transformer may be used in industrial plants for taking current from the main feeder lines. It is designed ordinarily for mounting in a weather-proof tank on a pole and is operated automatically by an oil time switch. The theory of operation is identical with that of the company's station type constant-current transformer, all parts being submerged in oil. It is intended primarily for outdoor use and for operation on circuits of 2000 to 2400 volts, and the current from full load to no load is stated to be maintained within 1 per cent of the normal value.

#### LaBelle Iron Works Report

The annual report of the LaBelle Iron Works, Steubenville, Ohio, for the year ended Dec. 31, 1916, shows a surplus after the payment of interest and dividends of \$3,100,445.50. Following is a statement of the income account:

Net earnings from operations, after charges for maintenance and repairs of \$1,037,900.....	\$6,408,136.01
Other income .....	26,182.40
Total income .....	6,434,318.41
Deduct reserves:	
For exhaustion of minerals and extinguishment of lease values.....	260,214.42
For depreciation of special equipment.....	48,945.36
For accidents and contingencies.....	158,139.13
Interest on mortgage bonds.....	209,166.25
Net earnings .....	5,758,752.75
Deduct:	
Provision for inventory reserve, adjustments, etc. ....	1,000,000.00
Discount on bonds sold plus net premium on bonds purchased for treasury .....	191,151.25
Premium on bonds redeemed.....	79,000.00
Surplus for 1916.....	4,488,601.50
Deduct dividends .....	1,388,156.00
Balance .....	3,100,445.50
Add surplus Jan. 1, 1916.....	3,056,318.32
Total surplus .....	6,156,763.82
Deduct appropriation for depreciation.....	500,000.00
Surplus carried to balance sheet.....	\$5,656,763.82

The condensed balance sheet as of Dec. 31, 1916, is as follows:

Assets	
Land, plant, equipment, etc.....	\$24,835,839.72
Investments at or below cost.....	167,371.87
Cash with trustee for redemption of gold.....	20,475.00
Inventories at cost.....	4,549,008.18
Accounts and notes receivable.....	2,460,788.38
Cash .....	2,937,161.75
Deferred charges to future operations.....	25,651.92
Total .....	\$34,996,296.82
Liabilities	
Common stock issued.....	\$9,915,400.00
Preferred stock issued.....	9,915,400.00
Bonds issued .....	3,242,500.00
Accounts payable .....	783,336.53
Wages, taxes and royalties accrued.....	438,810.00
Bond interest accrued and coupons not presented for payment .....	21,547.95
Common stock dividend payable Jan. 31, 1917..	99,154.00
Bonds called for redemption—cash held by trustee .....	20,475.00
Reserves:	
General depreciation .....	2,117,496.32
Exhaustion of minerals.....	1,400,069.88
Relining and rebuilding furnaces, etc.....	155,891.93
Accidents and contingencies.....	229,451.29
Future fluctuations in prices, etc., of raw materials and supplies.....	1,000,000.00
Surplus at Dec. 31, 1916.....	5,656,763.82
Total .....	\$34,996,296.82

The total production of ore in the mines of the company for the year 1916 was 352,803 gross tons. The coke output was 112,986 net tons. The output of coal was 165,289 tons. The production of the iron and steel works was as follows, in gross tons:

Pig iron .....	257,623
Ingots .....	416,783
Billets and slabs.....	350,426
Finished goods .....	416,827

Regarding the outlook for 1917, President R. C. Kirk comments as follows: "At the time the last annual report was submitted business conditions seemed to justify the hope that your plants could be profitably operated to capacity, which hope was realized, as the demand became more insistent with each succeeding month, prices increasing to a point beyond previous price records for finished steel products. Business booked at remunerative prices will engage your capacity for months to come, and the outlook can be considered promising."

The Bacharach Industrial Instrument Company, manufacturer of gas meters, pressure and draft recorders, carbon dioxide indicators, thermometers, etc., has removed to 422 First Avenue, Pittsburgh. The space occupied is larger than that at the former location, 14 Wood Street, and has allowed additional equipment to be installed.

## THE TARIFF COMMISSION

### As Appointed by the President, It Is Composed of Anti-Protectionists

WASHINGTON, March 20, 1917.—President Wilson has forwarded to the Senate the nominations of the six members of the Tariff Commission authorized by the omnibus revenue law of Sept. 8, 1916, the selections including Prof. Frank W. Taussig of Massachusetts, appointed for 12 years, Daniel C. Roper of South Carolina, 10 years, David J. Lewis of Maryland, eight years, William Kent of California, six years, William S. Culbertson of Kansas, four year, and Edward P. Costigan of Colorado, two years. The successors of these commissioners will each be appointed for a full term of 12 years except in case they may be chosen to fill the unexpired term of a predecessor.

Professor Taussig who, it is announced, will act as chairman of the commission, is described in a bulletin given out by the White House as "a well-known political economist and a profound student of tariff matters." He has been connected with Harvard University since 1882 and his writings in support of the so-called free trade policy are well known. Inasmuch as it is announced that he has secured leave of absence from his university until September, 1918, it is believed that his chief duty will be merely to organize the commission, when he will retire in time for President Wilson to appoint his successor.

Daniel C. Roper, who has been given a 10-year commission has held various offices. He served in the present Administration as First Assistant Postmaster General, a post which is frequently referred to as that of "official headman" because of the fact that it is the chief duty of the incumbent to distribute the enormous political patronage of the Post Office Department. Mr. Roper resigned his commission in the Department last summer in order that he might take an active part in President Wilson's campaign for re-election, as was officially announced at the Department at the time. His sole knowledge of tariff matters has been gained while serving as clerk to the Ways and Means Committee in a single Congress.

David J. Lewis of Maryland has represented the Sixth Congressional district of that State in the House of Representatives during the past six years. During the greater part of the past year he devoted himself almost exclusively to an active canvass for a seat in the Senate but was defeated. He has served as chairman of the House Committee on Labor, is an avowed champion of the most extreme views of organized labor and has been regarded as one of the strongest opponents of scientific shop management. Since his defeat for the Senate it has been confidently predicted by his friends that he would be "taken care of" by the Administration. He has been appointed for a term of eight years at the same salary drawn by a United States Senator.

William Kent of California has also served in the House of Representatives for six years, having been elected as a so-called Independent after leaving the Republican party in 1910. His views on economic questions relating to the industries of his State were so strongly resented by his constituents that he did not seek re-election last November, but organized and managed the Wilson Independent League of California to the expenses of which he is said to have generously contributed. He receives a six-year term at the same salary drawn by him as a member of the House.

William S. Culbertson of Kansas has resided in Washington for several years. He was a subordinate employee of the Taft Tariff Board and served in a similar capacity for the Senate Finance Committee while the Underwood-Simmons tariff act was being framed. He now holds a modest official position as an examiner in the legal department of the Federal Trade Commission.

Edward P. Costigan of Colorado is a lawyer living in Denver. It is said he was at one time a Republican, but it is a matter of record that in 1912 and in 1914 he was an unsuccessful candidate for the governorship of his State on the Progressive ticket. Mr. Costigan's only

claim to a knowledge of the industries of the country is the fact that he has specialized in mining law and is the author of a text book on that subject.

It will be noted that, with the exception of the chairman of the commission, the longest terms of membership have been allotted to three politicians just retired from office. Messrs. Lewis and Kent, in addition to being extreme low tariff advocates, are enthusiastic champions of the single tax theory. Not a single member is either an avowed protectionist or is identified with the Republican party.

Under the law creating this commission it is made the duty of this important body "to investigate the administration and fiscal and industrial effects of the customs laws of this country now in force or which may be hereafter enacted, the relations between the rates of duty on raw materials and finished or partly finished products, the effects of ad valorem and specific duties and of compound specific and ad valorem duties, all questions relative to the arrangement of schedules and classification of articles in the several schedules of the customs law, and, in general, to investigate the operation of customs laws, including their relation to the Federal revenues." The commission is clothed with power to inquire into "the tariff relations between the United States and foreign countries, commercial treaties, preferential provisions, economic alliances, the effect of export bounties and preferential transportation rates, the volume of importations compared with domestic production and consumption, and conditions, causes and effects relating to competition of foreign industries with those of the United States, including dumping and cost of production."

The law also clothes the Tariff Commission with extraordinary powers in connection with investigations it may undertake, providing that its agents "shall have access to and the right to copy any document, paper or record, pertinent to the subject matter under investigation, in the possession of any person, firm, copartnership, corporation or association engaged in the production, importation or distribution of any article under investigation, and shall have power to summon witnesses, take testimony, administer oaths, and to require any person, firm, copartnership, corporation or association to produce books or papers relating to any matter pertaining to such investigation." Any single member of the commission may sign subpoenas, and members and agents of the commission, when authorized thereby, may administer oaths and examine witnesses.

An unsuccessful attempt to secure the confirmation of the Tariff Commission was made in the Senate just before the adjournment of the special session, but the Administration leaders were obliged to consent to a postponement until Congress reconvenes in extra session. It is now reported that the President will give the commissioners recess appointments to enable them to begin at once the work of organization. W. L. C.

### Foreign Demand for Our Vanadium and Tungsten

Foreign demand for ferrovanadium and ferrotungsten continues unabated. In December, 1916, ferrovanadium exports amounted to 261,240 lb., bringing the total for 1916 to 2,031,207 lb. In the same month 224,632 lb. of ferrotungsten were exported, and the total for 1916 was 574,821 lb. The following table, made up from Government data, shows comparative figures and values:

Period	Ferrovanadium		Ferrotungsten	
	Pounds	Value	Pounds	Value
October, 1916 .....	245,326	\$236,749	96,280	\$230,894
November, 1916 .....	345,957	369,825	156,703	199,149
December, 1916 .....	261,240	292,969	224,632	599,545
Calendar year, 1914 ..	770,079	640,948	.....	.....
Calendar year, 1915 ..	840,265	741,085	.....	.....
Calendar year, 1916 ..	2,031,027	2,035,276	574,321	1,352,631

In 1913 the vanadium exports were only 604,287 lb. Taking the rate for the last three months of 1916, they are at the rate of 3,410,088 lb. per year. Before the war very little tungsten was exported, so little that no separate record was published by the Government.

# The Supply of Basic Bessemer Ore

Little Ore Found That Alone Will  
Make Pig Iron Suitable for the Basic  
Converter—Furnace Mixtures Necessary

BY H. H. CAMPBELL

IT is a comparatively easy matter to say what we mean by acid Bessemer ore, for it is only necessary to say that it shall give a pig iron with less than 0.10 per cent of phosphorus, provided of course that it does not carry prohibitive proportions of sulphur or arsenic or titanium. It is not so easy to define basic Bessemer ore, for, if we require that it shall make a pig iron suitable for the basic converter, then there is scarcely a deposit of ore in the world that will meet all the conditions. Everywhere a mixture is used in the blast furnace where one kind of mineral supplies the necessary manganese, another makes up a shortage in phosphorus, while another may contribute lime.

One works near Hanover in northern Germany has a furnace mixture that is almost ideal, but several different ores are used; one carries 5 per cent of manganese, while another runs 10 per cent in phosphorus. At this one spot it happens that all the different components are near together and all the mines are owned by one company; but the supply of raw material is limited and this particular district makes only a small portion, perhaps 5 per cent, of the total basic Bessemer steel produced in the world. As this company has been in operation for 30 years and is very prosperous and abundantly able to enlarge the capacity of the plant if it were deemed best to do so, it seems plain that its managers have cut their coat according to the cloth and that they are wisely conserving an ore supply that evidently has its limits.

## The Minette Deposit in Lorraine

The Minette deposit in German and French Lorraine is the most important source of supply of basic Bessemer ore, but as this field was fully described by the writer in *THE IRON AGE* of July 15, 1915, it will suffice to say that the ore after being dried at 212 deg. Fahr., has about the following composition: Iron, 38 per cent; silica, 6.5 per cent; lime, 11 per cent; with enough phosphorus to give 1.70 per cent in the pig iron. The output of this district in 1913 was about 45,000,000 tons of ore, equivalent to 15,000,000 tons of pig iron. The beds contain 4,500,000,000 tons of ore; hence, at the present rate of consumption, the supply will last about 100 years. This ore makes about three-quarters of all the basic Bessemer steel produced in the world; but manganiferous ore must always be added in the blast furnace and usually ore or cinder high in phosphorus is also a part of the mixture. Thus the furnace burden is a composite of different minerals, not one of which is really a basic Bessemer ore.

## The Swedish Deposits

Sweden has always produced a considerable amount of low-phosphorus ore, which has been used at home; for, although there is almost no coal in Sweden, it is possible to carry on quite an industry by using charcoal for fuel, since the pig iron and bar iron produced command a high price on account of their purity. Until recently, however, it was out of the question to utilize great deposits of impure mineral, because the extra expense of importing

fuel raised the cost of finished products above the market price in more favored countries, and because a generation ago no iron ore was ever carried over sea unless it was low in phosphorus, so that it could be used for making acid Bessemer steel.

The whole situation was changed by the invention of the basic converter, since there was an immediate demand for ore containing phosphorus. So in 1881, or only two years after the Thomas process had been started on the continent of Europe, the German ironmasters were making inquiries in Sweden for iron ore, and shipments began the next year; but as late as in 1885 the exports of all kinds of ore from Sweden amounted to only 26,000 tons. From that time exportations have steadily increased until in 1913 they were as follows: To Germany, 4,564,000 tons, to Great Britain, 367,000 tons; to the United States, 356,000 tons; to Austria, 221,000 tons; total, 5,508,000 tons.

There are three main sources of supply. The oldest is the Grangesburg district, about 150 miles northwest of Stockholm, the ore being shipped from Oxelosund on the Baltic Sea. The amount of mineral in sight is about 100,000,000 tons, and the exports in 1913 were 624,000 tons. At this rate the supply will last 150 years; but the Swedish Government has ordained that shipments must be reduced in the future so that after 1918 only 450,000 tons per year can be mined.

## SWEDISH LAPLAND

North of the Arctic Circle, beyond latitude 67 deg., there are huge deposits of ore at Gellivare and Kiirunavaara. The Gellivare mines are nearest to the Baltic Sea and most of the ore is shipped from Lulea; but this port has its disadvantages, because the Gulf of Bothnia is frozen more than half the year, and also to reach the harbor of Rotterdam, where most of the ore is sent, requires a journey of about 1200 miles through the Cattegat and Skagerrack, or else a trip through the Kiel Canal. Some of this Gellivare ore, however, as well as all the output of the mines at Kiirunavaara, goes to the port of Marvik on the west coast of Norway, which is ice-free all the year.

The Gellivare mines were opened in 1892, but the Kiirunavaara deposits did not begin shipments until 1903. Since then there has been great activity and in 1913 the shipments from Swedish Lapland amounted to 4,420,000 tons. At Gellivare there are about 240,000,000 tons of ore in sight and the shipments in 1913 were 1,151,000 tons; but the Government will allow as much as 1,500,000 tons per year. At Kiirunavaara there are 740,000,000 tons in sight, and the exports in 1913 were 3,268,000 tons with an allowance of 5,000,000 tons. It is evident that at all three fields the Swedish Government has planned to have the ore last about 150 years.

A small part of the Lapland ore is fairly low in phosphorus and a little will make iron of standard Bessemer grade; the greater part will give an iron with, say, 0.50 per cent of phosphorus, but most of the ore will give a pig iron with anywhere from 1.5 per cent to 7 per cent or more, since some of the

ore runs as high as 5 per cent in phosphorus. As a consequence of these wide fluctuations in this important element, the Grangesburg Company, which controls practically all exports of ore under an arrangement with the Swedish Government, has established a system of mixing the ores so as to get any required composition, just as a druggist would make up a prescription.

The subjoined table gives five grades which form three quarters of the exports from Sweden. As above stated, most of this ore goes to Westphalia, Germany, where it is mixed with Minette and other ores, and eventually it appears as basic Bessemer steel. The Swedish ore sent to Germany accounts for over 3,000,000 tons of steel, and, allowing for some that is used in open-hearth furnaces, it probably in 1913 made one-sixth of all the basic Bessemer steel produced in the world. In spite of these facts, and notwithstanding the high phosphorus in the Lapland ore, not one of the ores given in this table can be called a true basic Bessemer ore; because in all of them the manganese is only 0.1 per cent and manganiferous ores must be added to the furnace mixture in order to get a pig iron suitable for the basic converter.

Composition of Swedish Ore—Per Cent

	Iron	Phosphorus	Silica	Lime
Grangesburg .....	61.3	1.05	4.3	
Gellivare .....	65.3	0.62	3.0	2.3
Gellivare .....	64.2	0.98	2.1	3.6
Kiirunavaara .....	62.1	1.96	1.8	4.8
Kiirunavaara .....	58.2	2.98	1.7	8.2

The Cleveland District in England

Basic Bessemer steel was first made at Middlesbrough, England, in 1878, and it has been made there continuously ever since; but the basic converter has never made much headway in that country and production by that process is declining. The reason for this will be found in the composition of Cleveland ore, which is the foundation of the iron industry of northern Yorkshire; and as there are many other places where similar mineral is found and where the basic Bessemer has failed, it will not be unprofitable to study the conditions at Middlesbrough. The following table gives the composition of two grades of Cleveland ore, the "best" and the "inferior" in both the natural state and "after ignition" for this ore is always roasted before being put into the blast furnace.

Composition of Cleveland Ore—Per Cent

	Natural		Calcined	
	Best	Inferior	Best	Inferior
Silica .....	10.00	14.40	14.10	19.60
Alumina .....	9.30	9.60	13.10	13.10
Lime .....	5.10	5.80	7.10	8.00
Magnesia .....	3.70	3.90	5.10	5.30
Iron .....	29.10	26.60	40.80	36.30
Manganese .....	0.30	0.20	0.50	0.40
Sulphur .....	0.10	0.30	0.10	0.20
Phosphorus .....	0.45	0.48	0.68	0.62
Moisture .....	9.50	7.00	....	....
Loss on ignition...	23.00	23.30	....	....

The sulphur in Cleveland ore occurs largely in the accompanying shale, rather than as part of the iron-bearing components, and so the proportion varies widely in different samples, running from 0.10 to 0.30 per cent, although much of this is eliminated during the roasting. The inferior grades of ore after calcination carry nearly 20 per cent of silica. To understand the situation at Middlesbrough, we must know that the best ore is rapidly disappearing, so that thinner and worse seams are being mined every year, while more and more hand picking is required to remove sulphur and shale. In making any estimate of the amount of ore available, we must fall

back on reserves of a quality that is poorer than even this "inferior" grade.

Cleveland ore when used alone will give 1.5 per cent of phosphorus in the pig iron; hence, if basic Bessemer iron is to be made, it is necessary to buy puddle cinder or Swedish ore to raise the phosphorus to 2 or 2.5 per cent. It is also necessary to import manganiferous ores to get over 1 per cent of manganese in the pig iron. These additions of phosphorus and manganese cost money; but the Cleveland ore has some shortcomings that are even more objectionable. High silica is combined with high sulphur, so that the silicon in the pig iron must be as high as 2 per cent or more to avoid a content of sulphur over 0.10 per cent. But this high silicon means heavy lime additions in the converter, and also great wear of the lining; while the slag can hardly be used as a fertilizer on account of its low percentage of phosphoric acid. All these conditions make for bad practice and the waste runs up to 16 per cent, while the steel produced is irregular in composition.

DOUBTFUL CLASSIFICATION OF CLEVELAND ORE

Considering these facts, it is not surprising to find that the high hopes entertained by the English ironmasters a generation ago have not been realized. To-day the basic Bessemer in Yorkshire and throughout England may be regarded almost as a "survival"; and it would not be surprising if before many years the basic open-hearth furnace should supplant the basic converter in England. In view of these conditions we are in doubt what name to give to the product of the Cleveland beds. If the ore can not be used commercially to make basic Bessemer pig iron, then it should not be called basic Bessemer ore; and if this is true of Cleveland ore as it averages to-day, it is still more true of the great mass of ore in the ground, which is higher in both silica and sulphur than that which has been mined for the last half century.

From this point of view we can not credit Great Britain with any reserves of real basic Bessemer ore. The same conditions apply to the ores of Lincolnshire and Northamptonshire in England; of southern Russia, Austria, German Poland, Cape Breton, Alabama and a thousand other places where the ore is deficient in phosphorus and manganese, and where the silica is high. Moreover, in some cases the coal is physically of poor quality and perhaps also high in sulphur as at Cape Breton and in Alabama. In many of these places it would be possible to operate a basic converter by buying large quantities of mineral high in phosphorus and manganese and by accepting bad working conditions as inevitable; but it is not possible to make steel in this way and compete on equal terms with the plants of northwestern Europe.

Reserves of Basic Bessemer Ore

For the reasons just given we do not know where to draw the line as to what is good ore and what is not; for when all the rich reserves of basic Bessemer ore in both German and French Lorraine are gone, we will surely use leaner mineral. In the Minette district there are large extensions where the ore is much higher in silica than in the areas that are mined to-day. There is not the slightest doubt that these lean beds will be worked some day in the future, and that pig iron and steel will be made; but, judging from what we now know, the basic converter will not make this steel, because some form of the duplex process will be a cheaper way of handling the high-silicon iron that will be produced. Thus we may say that, according to our present knowledge and standards, the stock of real basic

Bessemer ore in the world is embraced in the following list:

*Reserves of Basic Bessemer Ore—Tons*

	Ore	Equivalent Pig Iron
Minette .....	4,500,000,000	1,500,000,000
Grangesburg .....	100,000,000	60,000,000
Gellivare .....	240,000,000	160,000,000
Kiirunavaara .....	740,000,000	450,000,000
North Germany .....	50,000,000	20,000,000
Austria .....	50,000,000	20,000,000
Total .....	5,680,000,000	2,210,000,000

The world's output of basic Bessemer steel in 1913 was 16,370,000 tons, which would call for about 18,500,000 tons of pig iron; so that there seems to be a supply for about 120 years at the present rate of production. It will not do, however, to put very much weight on this calculation, for the figures given regarding the tonnage of ore in the ground are only careful guesses and because the production of basic Bessemer steel has been steadily increasing, having doubled between 1903 and 1913; while a considerable proportion of the pig iron made from the Minette and Swedish ores goes into foundry pig iron and into basic open-hearth furnaces. We must be content with the broad and general statement that the known supply of ore which, with moderate additions of manganese, will give a good basic Bessemer pig iron, is sufficient to last over a century at the present rate of production.

### U. S. Cast Iron Pipe Earnings

The eighteenth report of the United States Cast Iron Pipe & Foundry Company for the year ended Dec. 31, 1916, is the first report of this company to cover a period corresponding with the calendar year. Net earnings for 1916 were \$1,308,641.32, as compared with \$305,787.97 for the seven months' fiscal period of the previous report and as compared with \$308,382.11 for the calendar year 1915. The balance as of Dec. 31, 1915, amounted as \$558,804.63, of which \$480,000 was appropriated in dividends on the \$24,000,000 outstanding stock. The profit for the year ended Dec. 31, 1916, was \$1,308,641.32, making a total surplus on that date of \$1,387,445.95. The company's net working capital as of Dec. 31, 1916, is \$3,617,608.84 as compared with \$3,398,329.45 as of Dec. 31, 1915. The income account for 1916 is as follows:

Total earnings, after deducting cost of operation and maintenance of plants, expenses of sales and general offices and provision for taxes, doubtful accounts and adjustment of materials and supplies inventories.....	\$1,539,742.34
Other income .....	30,153.92
	1,569,896.26
Reserved for improvements and replacements...	144,000.00
	1,425,896.26
Deduct:	
Interest on bonds issued.....	\$100,740.00
Less interest on treasury and sinking fund bonds .....	40,020.00
Interest on bills payable.....	56,534.94
Net profit for 1916.....	\$1,308,641.32

The condensed balance sheet as of Dec. 31, 1916, is as follows:

<i>Assets</i>	
Property and plant.....	\$24,611,701.68
Cash with trustee for bonds.....	14,437.49
Cash on deposit and on hand.....	382,730.91
Accounts and notes receivable.....	2,041,893.23
Inventories of raw materials, manufactured product, etc. ....	3,077,790.86
Total .....	\$30,128,554.17
<i>Liabilities</i>	
Preferred stock .....	\$12,000,000.00
Common stock .....	12,000,000.00
Bonded debt .....	821,000.00
Accounts and bills payable.....	1,820,224.21
Accrued taxes, interest, etc.....	64,581.95
Reserves:	
Improvements and replacements.....	134,960.71
Insurance .....	123,686.74
Doubtful accounts, etc.....	76,654.61
Surplus:	
Working capital reserve.....	1,700,000.00
Profit and loss account.....	1,387,445.95
Total .....	\$30,128,554.17

The following extracts are from the accompanying statement of President L. R. Lemoine:

"There is no question that, so far as the domestic demand for our product is concerned, uncertainties growing out of the war, the higher prices in the costs of iron, fuel and labor, and the consequent higher prices charged for our product, diminished the demands therefore, so that at no time during 1916 were our plants operated to more than 70 per cent of their capacity and for several extended periods at much below this ratio. This undoubtedly signifies merely a damming up of tonnage pending a return to more normal conditions; and in the meantime, even with the continued uncertainties that now exists, the minimum requirements for our product should not fall much if any below last year.

"As to exports there has been a decided expansion. Shipments aggregating a considerable tonnage have gone to the Hawaiian Islands, the Philippines, Cuba, Porto Rico, Brazil, Argentina, Venezuela, Chile, and even to far away Egypt; and there are pending additional tonnages for most of these countries and others, including South Africa, Japan, China and Russia. There was booked during the past few months an order for some 60,000 metric tons of pipe and fittings for the Argentine. This exceptional contract is regarded as paving the way for other important tonnages in South America and your board is hopeful for a material and probably a permanent growth in your export business.

"The remodeling of the Bessemer (Ala) works was continued through the year. There was expended thereon during the year, including the construction of a new machine shop and equipment therefor, \$531,285.06, of which \$338,917.75 was charged to plant account and the balance, \$192,367.31 to reserve for improvements and replacements. While various plant accessories and renewals have yet to be made to round out the improvements at these works, they may now fairly be regarded as the most modern and efficient of your plants. What has been accomplished will make for increased efficiency and insure a better product.

"During the year there was absorbed in operating costs covering expenditures for repairs to buildings, machinery equipment, tool repairs, minor replacements, maintenance and improvements in shop methods, the sum of \$650,222.32, or some 35 per cent more than the amount expended for the purpose in the calendar year 1915 and 54 per cent more than in the calendar year 1914. In addition there was expended, and charged to the account known as reserve for improvements and replacements the further sum of \$227,491.38 of which \$192,367.31 was for account of the Bessemer works. At the close of the year the mortgage on your Birmingham works became due, with outstanding bonds aggregating the sum of \$179,000, which were paid off out of the company's cash resources, and the mortgage released."

The Indiana Rolling Mill Company, New Castle, Ind., was unfortunate in having its plant demolished by a cyclone on March 11, but it has decided to rebuild and make the plant bigger and better than ever. Contracts have been let with the Pan-American Bridge Company of the same city, for the erection of steel buildings. The contractor has all of the material in stock, and has promised to double its force, and to have the buildings erected inside of 30 days. It is confidently expected that the plant will again be in operation in six to eight weeks. This plant is sometimes referred to as Indiana Shovel Company, as it not only manufactures sheet steel and harrow discs, but also shovels, spades, etc.

During a year of extraordinarily high prices, says *Bradstreet's*, the savings banks of New York State were well patronized with deposits, while being favored by light withdrawals. These banks on the first day of this year had total resources of \$2,139,299,037 and aggregate deposits of \$1,953,663,728, both sums being the largest ever chronicled. Deposits in 1916, not including interest credited or paid, went up to the high-water mark of \$488,678,661, a gain of \$76,176,398, or 18 per cent., over 1915. This volume of increase is truly remarkable.

## BETHLEHEM STEEL REPORT

**Net Earnings in 1916 Were \$61,717,309, or Two and a Half Times Those of 1915**

The net earnings of the Bethlehem Steel Corporation for the year ended Dec. 31, 1916, were \$61,717,309.58, and the corporation appropriated for and invested in additions to property and working capital \$35,000,000. The total net earnings stated above is, of course, the remainder after deducting taxes (\$4,913,702.55) and expenditures for ordinary and extraordinary repairs and maintenance (approximately \$12,498,000). The net earnings for 1915 were \$24,821,408.25 and for 1914, \$9,649,667.71.

From these earnings were deducted interest on bonds and notes of subsidiary companies, amounting to \$3,772,555.67, and provision for depreciation and depletion, amounting to \$14,350,785.75, leaving as a net income for the year \$43,593,968.16, compared with \$17,762,812.61 for 1915 and \$5,590,020.18 for 1914.

The large increase in the amount of depreciation over that provided in any past year and "in excess of that which will be necessary in future and normal times," says the joint statement of C. M. Schwab, chairman of the board, and E. G. Grace, president, "has been made in order to write off during the life of the contracts machinery installed for war orders so that the balance sheet of the corporation may be conservative." It is interesting to note that in the 12 years since 1904 or since the formation of the Bethlehem Steel Corporation, the total appropriations for and invested in additions to property and working capital have amounted to \$60,000,000, of which, as stated, \$35,000,000 was appropriated in 1916, and that in this 12-year period dividends to the amount of \$9,564,590 were paid, and of this \$5,502,160 was paid in 1916.

The orders on hand on Dec. 31, 1916, amounted to \$193,374,248.69, against \$175,432,895.19 at the end of 1915, and \$46,513,189.95 at the end of 1914.

The average number of employees in the corporation's plants in the United States in 1916 was 47,013, against 22,064 in 1915 and 15,586 in 1914. Wages paid in 1916 amounted to \$51,499,773.45, against \$21,800,664.19 in 1915 and \$14,312,948.78 in 1914.

### Bonus Payments to Employees

In the report considerable attention is paid to the bonus system of making compensation dependent on results accomplished. "The terms of the system as applied to general officers," it says, "have always been fixed, with the approval of the board of directors, by Mr. Schwab, who has never participated therein. The consistent adherence to this principle is regarded by your directors as one of the principal causes of the efficiency of your corporation's organization, and of the enthusiasm and esprit de corps in every department which have rendered possible the remarkable achievements and growth of the past two years.

"The application of this system in the different departments varies according to the character of service and the basis of compensation. In the case of workmen receiving bonus payments, they are usually based upon the amount by which results of their work for the day exceed a fixed task. In the case of foremen and shop superintendents receiving bonus payments, they are usually based either upon savings effected in costs below established averages, or upon profits made in their departments. In the case of salesmen receiving bonus payments, they are usually based on actual profits on orders booked by the particular salesmen.

"In the case of general officers of your corporation and its subsidiary companies (whose fixed salaries are in nominal amounts), and in the case of heads of general departments, the bonus payments are a percentage of net earnings (after deducting interest charges, but not depreciation) of the companies in the operations of which such general officers or heads of general departments exercise control. In most cases, such percentages are now on a sliding scale, the percentage increasing as earnings increase. Thus in lean years the compensation is small, and in years of liberal profits

the compensation is liberal, in proportion to the degree of success attained.

"During the past two years of phenomenal profits your corporation adhered, as in loyalty it was bound to do, to the system previously in force, which necessarily resulted in unusually liberal compensation to the various officers and employees affected by the system, but, in the opinion of your directors, not out of proportion to the results accomplished and the unusual effort and responsibility involved in accomplishing these results under the conditions which prevailed.

*Relation of Bonus Payments to Net Earnings*

Year	Total Bonus Payments to General Officers and Heads of General Departments	Percentage of Such Bonus Payments to Net Earnings of Corporation
1911.....	\$118,512.56	4.18
1912.....	130,575.26	4.03
1913.....	524,506.05	7.31
1914.....	603,235.71	7.50
1915.....	1,897,492.71	8.12
1916.....	4,748,043.67	7.57

"Under the system as now in force the aggregate of individual minimum percentages of net earnings (including bonus payments) of your corporation which are payable by way of bonus to general officers and to the heads of departments having general control of matters affecting your corporation as a whole is 3.43 per cent. This aggregate percentage increases with earnings to a possible maximum of 8 per cent."

### Some of the Year's Purchases

In reference to the later purchases of the Bethlehem Steel Corporation, the report has the following to say: "The purchase price of the properties of American Iron & Steel Mfg. Company was \$6,660,000, which was paid in bonds of Penn Mary Steel Company, secured by a mortgage upon the real estate and plants acquired and guaranteed by Bethlehem Steel Company. The rivet plants give your corporation control of the supply of rivets required by its shipbuilding and bridge plants." The acquisition of the Pennsylvania Steel Company properties, the report points out, gives not only an increased output of T rails, but also girder rails, fish-plates, tie-plates, frogs, crossings, switches, switch stands and signals. The purchase of the Lebanon properties of Lackawanna Iron & Steel Company is also mentioned at length, and the fact that the large interest in the Cornwall Ore Banks "will permit their development for maximum output and most economical operation." The purchase of the Lehigh Coke Company was also outlined.

### Thomas Iron Company Again Sought

Easton, Pa., advices state that William H. Bilyeu, of Philadelphia, appeared before a stockholders' committee of the Thomas Iron Company, March 14, and asked the opportunity to resume negotiations toward the purchase of its property, requesting an option of 60 days to buy the property for \$3,500,000.

The committee decided that if Mr. Bilyeu would deposit \$50,000 on or before March 28 as an evidence of good faith a stockholders' meeting would then be called to approve the purchase. The price named is the valuation placed on the property by the stockholders last summer. A meeting will probably be held about two weeks after the deposit of the \$50,000.

### To Build Ship Hulls at Milliken

Milliken Brothers, Inc., has made arrangements to build hulls for steel ships at its fabricating plant at Milliken, Staten Island, N. Y. It will be recalled that while the Milliken plant has been sold for occupancy by the purchaser some months later, the Milliken company will continue to operate it until it has other fabricating facilities, so that it may continue uninterruptedly in the business of erecting steel buildings and bridges. The arrangement of sale provided that when the new owners take over the plant the Milliken institution may retain fabricating facilities to complete work while their new works are being acquired or constructed, as the case may be.

ESTABLISHED 1855

# THE IRON AGE

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## Present Phases of the Dissolution Suit

The arguments before the Supreme Court in the dissolution suit against the United States Steel Corporation show that this case in its present status differs radically from the suits against the American Tobacco Company, the Standard Oil Company and other consolidations. In the suits against the other companies great stress was laid upon the alleged oppression of competitors and a vast amount of testimony was introduced to show that the big companies were not fair in their treatment of smaller concerns. In the Steel Corporation suit the Government now has virtually abandoned the claim of unjust treatment of competitors. A noteworthy statement by Mr. Colton in his argument for the Government was that manufacturers competing with the corporation were benefited by its influence in maintaining prices and that there was no reason why those competitors should not be friendly to it as long as they were "permitted to stand under the corporation's big umbrella." The Government seems to be shooting at the umbrella not because many manufacturers were protected, but because it is solicitous for the consumers, who, it claims, suffer on account of the price maintenance policy of the corporation and other companies.

Another interesting feature of the case as disclosed in the argument is additional evidence of the predominating personality of Judge Gary's broad-minded policies. Solicitor-General Davis was particularly careful to explain that the court was not asked to disapprove Judge Gary's views about business. Evidently the Government has no desire to attack Judge Gary. Its task is to show that the corporation has dangerous power which might be abused by a successor of the judge.

The many questions asked by the learned justices indicate keen interest on their part, but the newest acquisition to the bench, Justice Clarke, was rather conspicuous by his silence. Perhaps this is because he has less reason for asking for explanations from the attorneys, for he lived for many years in the atmosphere of the blast furnaces and the steel plants in the Youngstown district.

The Government's contention that the final decision should end matters as to the merits of the controversy, and that the case should not be held in abeyance indefinitely and nursed along in the hands of the justices, will, we believe, be generally approved.

## Making Sales Contracts Binding

Last summer the National Association of Sheet and Tin Plate Manufacturers approved a form of contract for the sale of black and galvanized sheets, etc., and recommended its adoption by the mills. Comment on the proposed contract form was made in THE IRON AGE of July 17, 1916. The object was to furnish a contract form which would be binding upon both parties, so that a transaction once made would stand as a sale, and not, as formerly in the case of the sheet trade, an option given by the producer to the buyer.

There was considerable criticism of the proposition, on the part of buyers of sheets. This did not deter sheet mills from adopting it, and the interesting turn the situation has taken in the past few months is that substantially this new form of contract has been adopted for their own sales by some of those who, as buyers of sheets, objected to it. Either they recognize that it is good in itself, or they feel that if they must buy their materials under such terms they ought to sell their products in the same manner. A full statement may become available later, indicating the bodies of manufacturers who have adopted this new binding contract.

Another recent development in connection with the "binding contract" is that actual circumstances have come about wherein the buyer sees an opportunity to set up claims under it. At the outset the sheet manufacturers had some difficulty in emphasizing to buyers the fact that the proposed obligation was to be mutual, that the damages provided by the contract were to work both ways, the buyer to pay damages to the seller if he failed to specify or receive the goods, the seller to pay damages to the buyer if he failed to deliver on time, except for certain unpreventable contingencies. To-day there is no buyer of sheets who wishes to be relieved of his obligation. The present market price of black sheets is \$10 per ton higher than two months ago and \$20 per ton higher than four months ago.

When the subject of eliminating "the contract evil" was under discussion there was a disposition frequently to take the superficial view that the proposed reform would mean merely a change in the form of contract, whereby transactions would be made as previously, but under a different form of contract. In our discussion of the subject last July it was pointed out that this would not be the

real nature of the change. The transactions themselves would be changed. The quantities placed under contract would be smaller and the periods of delivery would be shorter, because, faced with the possibility of having to pay damages, neither party would undertake as large obligations as were entered into, on paper, under the common form of contract.

Whether as a result of the new practice or not, the fact stands out to-day that the distance ahead to which sheets are sold is less than is the case in nearly all other finished steel products. The sheet mills have not formally opened their books for sales for shipment beyond July 1, a date only a trifle more than three months distant. In several other finished steel products, in which the option or "blanket" contract obtains, the prospective output is sold for much greater distances ahead. Whether the use of the new contract form has caused the sheet market to advance more rapidly in the past few months than would have been the case if the old practice in selling had continued is a question that can hardly be discussed at present. Perhaps when this whole movement is over it may be possible to analyze the occurrences and form a conclusion as to this interesting point.

### The Tariff Commission Appointees

In appointing the Tariff Commission, President Wilson has missed a great opportunity to serve all the people of the country. As the records of the newly named members become more generally known the disappointment of fair-minded men of all parties will be profound. In the past few years the line of demarcation between free-traders and protectionists has not been so clearly drawn as it was for a long period after the Civil War. Both protectionists and free-traders have been making many concessions, and this tendency has been marked since the European war was declared, for it has been conceded by everybody that no one could predict with certainty exactly what tariff rates would serve the best interests of the country after the restoration of peace. Hence there has been a very strong desire to have an investigation conducted in a thorough manner, and without partisan bias of any kind, to determine all the essential facts, and thus lay the foundation for the building of a new tariff law.

The passage of the act creating the Tariff Commission was greeted with approval by people of all classes throughout the country, and it was earnestly hoped that President Wilson would appoint at least two or three men of large practical experience in business affairs, men not so wedded to any particular tariff theory that they could not proceed in a spirit of absolute fairness to collect data. It was taken as a matter of course that the great manufacturing interests of the country would have representation. For seven months after the enactment of the law authorizing the commission, the President delayed making the appointments, and from time to time authoritative statements were issued from the White House that the delay was due to the difficulty experienced by the President in finding men of sufficient ability and familiarity with the great industries of the country, as well as with the basic prin-

ciples of tariff construction, to fit them for the highly responsible positions for which they were to be chosen.

It was frequently said on behalf of the President that he wished to obtain men whose national reputation would be such that they could command the respect and confidence of the great manufacturing and importing interests of the country, and that the most serious trouble he had was in inducing men of large caliber to accept the appointments. When, after all this delay, the appointments were made, they furnish reason for the keenest disappointment. As described elsewhere in this issue of THE IRON AGE by our Washington correspondent, the appointees are a college professor, three recent office holders retired by the people, a Government clerk of modest rank, and a lawyer of more or less prominence in the politics of his State. Although the law authorizing the commission specifically provides that not more than three of its members shall be chosen from the same political party, and that "in making said appointments members of different political parties shall alternate as nearly as may be practicable," the statement has been freely made in Washington in the past few days, and not contradicted, that five of these appointees voted for President Wilson last November, and it is a well-known fact that several of them were among the most active workers in his campaign. All of the members are rated as having low tariff views and several of them are classed as free traders.

Doubtless the President did have some difficulty in making the selections, but we believe that many business men of large experience and high character recognize that service on this kind of a commission is imperatively demanded, and that they would have sacrificed their business interests if they had been called upon to do so. Certainly two or three could have been found who would have accepted this opportunity to serve their country. No commission has ever been authorized by Congress having functions of greater importance, or clothed with more comprehensive powers, and it is doubtful whether such a body has ever been appointed with members who, as a whole, have been so poorly equipped for their duties, as are those whose names have just been sent to the Senate.

### British Supply of Crude Steel

Persistent reports of the growing independence of Great Britain as to supplies of steel from foreign sources have been current in this country for some time. Actual facts have not been plentiful, our vastly expanding steel exports in general tending to discredit these rumors. An examination of the official statistics of both Great Britain and the United States reveals some interesting contrasts and light on this point. The following table is compiled from these data:

<i>Export of Billets, Ingots and Blooms from the United States—</i>				
	<i>Gross Tons</i>			
Destination	1913	1914	1915	1916
United Kingdom	51,013	35,291	359,125	289,414
Canada	40,686	14,325	58,486	105,420
Other countries	148	880	143,093	211,394
France				902,499
Totals	91,847	50,496	560,704	1,508,727

The increase in our raw steel exports to Great

Britain in 1915 to seven times the normal, as judged by those of 1913, and to ten times those of 1914, but falling off in 1916, is striking. Still more marked is the great absorption by France in 1916, which, by comparison, was practically nothing in former years, having been included under "other countries." The increase in 1916 in the total exports to thirty times those of 1914 is beyond the expectations of the most optimistic, even early in the war.

Taking Great Britain's raw steel imports the following official data are interesting:

*Imports of Blooms, Billets and Slabs into Great Britain in 1916—Gross Tons*

From	1913	1914	1915	1916
Germany .....	312,223	184,604	.....	.....
Belgium .....	108,803	58,267	105	.....
United States .....	64,945	30,228	349,046	119,493
Other countries .....	28,017	25,637	78,845	26,648
Totals .....	513,988	298,736	427,996	146,141

These figures show that while in 1915 the United States replaced Germany as a source of raw steel, in 1916 Great Britain's imports were only one-third of those of 1915, in spite of her growing requirements, the supply from the United States falling off 66 per cent.

The statement last fall by a prominent member of the British Ministry of Munitions that plant extensions and new works were making such strides that the steel shortage would entirely disappear early in 1917 and that foreign supplies of shell steel could be dispensed with by March 31, 1917, is made more significant by the official data here cited, showing a constant decrease in imports.

It is well to reflect on what this may mean after the war. The British steel industry is making wonderful strides under the most difficult conditions. The 1916 steel output probably exceeded that of 1915, which in itself was a record. It logically follows that British competition in the world's markets after the war will not be an insignificant factor, but probably more important than before the war.

### Ore Moving Slowly

The large accumulation of iron ore on Lake Erie docks on March 1, which was 8,449,839, an increase of 2,236,100 tons compared with the tonnage on docks a year earlier, has been attributed in some quarters to the railroads. They probably are to blame to some extent. The extremely cold weather of January and February, which made the handling of ore very difficult, was also an important factor. Recently there has been an ample supply of cars, but the furnaces have been slow in coming forward with orders, and shipments are now about 75 to 80 per cent of what they were a year ago. The movement has been so slow that the outlook is that unless the opening of navigation should be very late there will be a very unusual tonnage on docks when the vessels start to bring the new ore down. Owing to the tremendous demand for ore which is expected later it is unfortunate that the handling during the winter has not been more rapid.

The Edward R. Ladew Company, Inc., Glen Cove, N. Y., manufacturer of leather belting, has removed its New York office from 137 Centre Street to 54 Franklin Street. This change will provide the company with larger quarters.

## CORRESPONDENCE

### Interesting Facts About the Great Pyramid

*To the Editor:* In connection with the metric and English systems of measurements which have recently been so much discussed, it may be interesting to know that a unit of lineal measurement similar to our standard inch was used in the construction of one of the most ancient structures in the world, the great pyramid in Egypt, which was built about 2170 B. C.

This structure has very many interesting scientific features which have been discovered by various engineers, mathematicians and professors who have made careful studies of the measurements and angles of the interior passages and chambers and the exterior dimensions. Every dimension and angle seems to have been carefully planned by the great designer so each measurement would indicate something relative to science or the history of our earth. He used a unit of measurement 0.001 in. longer than our standard inch; that is, a measuring unit equal to 1.001 in.

One of the scientific features that was first discovered was that the ancient vertical height of the great pyramid was to twice the breadth of its square base as the diameter of a circle is to its circumference; that is, 5813.01 pyramid-inches (its vertical height) is to twice 9131.05 pyramid-inches (its base line) as 1 is to 3.14159.

It follows that the ancient vertical height of the great pyramid is the radius of a circle the circumference of which equals the total measurements of all four sides of the pyramid's square base. This might be a practical solution of the old problem of "squaring the circle."

As a result of painstaking investigation it was ascertained that a unit of measure employed by the builders of the pyramid was a cubit of 25 pyramid-inches, or 25.025 standard in. The earth's axis of rotation or distance through the earth from the north pole to the south pole is approximately 7900 miles or 500,500,000 in. As one pyramid-inch equals 1.001 standard in. and the pyramid cubit contains 25 pyramid-inches, it follows that the earth's axis of rotation measures 500,000,000 pyramid-inches, or 20,000,000 pyramid cubits, and the semi-axis of rotation, the distance from either pole to the center of the earth, measures 250,000,000 pyramid-inches or 10,000,000 pyramid-cubits.

Accordingly, it was argued that the unit of measure employed in the design of the great pyramid was deduced from the earth's semi-axis of rotation. The metric meter was deduced from the measurement of the earth's curved surface from the north pole to the equator. It was supposed to be the ten-millionth part of this measurement, though owing to an error in calculation, it is not really so. It was contended that this method of basing the unit of measure on the curved line from pole to equator is not so scientifically true as that employed by the builders of the great pyramid, which was based upon the straight line of half the earth's polar axis.

Having seen that the pyramid unit of measure, the cubit, was deduced from the earth's axis of rotation, it is not surprising to find it employed to represent a day, the period of the earth's revolution around its axis; nor to find the breadth of the pyramid employed to represent a solar year, the exact period of the earth's revolution around the sun. Both the day and the year are thus recorded. On calculating the length of the four sides of the pyramid's square base, it is found that they each measured 365.242 pyramid-cubits, or as many cubits exactly as there are days in a solar year to the fraction. Thus four sides measure as many cubits as there are days in four years, including the leap year.

The great pyramid gives many similar values which we cannot give in detail; for instance, it gives for the mean distance from the earth to the sun 91,837,484 miles. It records the exact duration of the procession of the equinoxes a period or cycle of 25,827 years, a pyramid-inch representing a year.

A large number of the pyramid's scientific features show that in the time measure a pyramid-inch represents a year. Consequently, all standard inches must be converted into pyramid-inches in order to harmonize with certain periods of years which certain measurements may represent.

While perusing the findings of these pyramid investigations it seems that our inch has just naturally come down to us, and the ancient inch, being just 0.001 in. longer than ours, may seem to indicate that both the inch and its little offspring, the thousandth, are the most adaptable to our purposes.

ERVIN S. MUMMERT,

Vice-president Mummert-Dixon Company.  
Hanover, Pa., March 8.

### Tribute to Ford Motor Company

*To the Editor:* We wish to relate the following incident as an illustration of the thoroughness with which the spirit of courtesy and liberality of the Ford Motor Company pervades every one of its numerous departments.

We were searching for a better steel to use in one of the parts of our pneumatic tools and had heard that the Ford Company was using in its axles a steel of proper quality to satisfy our requirements. We wrote to them, without introduction, and asked if they would be kind enough to let us have an analysis of this steel and also the name of the firm manufacturing it. They replied immediately and not only answered our inquiries, but, from a thoroughly unselfish desire to assist us, they offered to make up, at their own expense, from various grades of steel, a number of the parts which were giving us trouble. They did this in order that we might find out, by test, which of the several varieties would most exactly suit our needs.

We, of course, accepted their offer, and within a week we received the steel and also a letter telling just the kinds and suggesting a formula for us to use in hardening it. Parts have been made up from this steel and treated in accordance with their formula and have passed all our tests.

We cannot withhold a feeling of admiration for the generosity of this great company and for the painstaking interest which they displayed in helping us to solve our difficulty, and it gives us great pleasure and satisfaction to be able to express our appreciation publicly.

GEORGE OLDHAM & SON COMPANY.

Frankford, Philadelphia, March 9.

### Our Large Copper Exports

Our exports of copper in 1916, while not as large as in 1913, a record year, were nevertheless really of very large proportions when it is considered that Germany, our previously largest customer, is unable to buy any here. The following table, compiled from Government data, illustrates this:

Period	Gross Tons
Calendar year 1913.....	413,500
Calendar year 1914.....	375,036
Calendar year 1915.....	304,026
Calendar year 1916.....	350,046

Of the 413,500 tons exported in 1913, Germany took 137,120 tons, or one-third, so that in reality the 350,046 tons exported in 1916, when none went to Germany, is proportionately at a greater rate than ever before. Of the 1916 exports, France took the largest amount, or 150,370 tons, with 82,395 tons going to the United Kingdom, 50,787 tons to Italy and 22,169 tons to Holland.

The voting trust certificate holders of the Marlin Arms Corporation have ratified the purchase of the Standard Roller Bearing Company for \$2,000,000 cash and 2000 shares of new Marlin Arms common stock and the purchase of the Rockwell-Drake Company for \$270,000 cash and 1350 shares of the new Marlin Arms common stock. It is also proposed to change the name of Marlin Arms Corporation to Marlin-Rockwell Corporation.

### Needs of France After the War

G. S. Thompson, representative in France of the American Steel Export Company of New York, has just returned from his Paris office for a conference with the officials of the company regarding the effects to be expected from the immediate and pending international complications.

While it is expected that great activities will take place after the war in the devastated area of France and Belgium in reconstruction work, Mr. Thompson brings word that this work is proceeding as rapidly as the territory is recovered and that reconstruction work follows right in the wake of the advancing army, the reparation of damage and the rehabilitation of factories proceeding right up to the firing line.

Heavy steel and metal products are required from time to time, running all the way from nails and wire to complete and massive mechanical equipment for the new and rebuilt factories and industrial works. Aside from the equipment and stocks actually destroyed, vast quantities have been removed for use in their own territories by the invading armies. In this way many large installations have been absolutely stripped of all operating equipment.

The demand for finished products in every form will probably continue for some time after the cessation of hostilities, owing to the fact that all the plants are engaged in munition and war equipment manufacture, but there is even now apparent, Mr. Thompson says, indication of a turning towards such products as ingots, steel bars, billets, tool steel, steel plates, tin plate, etc. Many of the plants now engaged in munition work are organized on a vast scale and will, when turned over to commercial pursuits, be able to produce an immense amount of material, but for many years after the war steel products will have to be imported to supplement local production. No ammunition maker in France today has a pound of reserve stock, but is operating on a hand-to-mouth basis and is often temporarily idle for lack of steel.

### Training Engineers for Foreign Business

Some reference to the provision which the American International Corporation makes for training engineers for foreign business commissions is contained in an article in *The Americas*, the publication of the National City Bank, New York, by S. T. Henry, vice-president Allied Construction Machinery Corporation. It will be recalled that this company was recently organized as a subsidiary of the American International Corporation to represent a group of leading non-competing manufacturers of construction machinery who, taken together, produce all of the many types of such equipment. The latter includes concrete mixing plants, shovels and excavating machines, trench digging machines, grab buckets, hoisting engines, air compressors and rock drilling machinery and light railway track and cars.

The company finds a great need for young engineers who have had domestic sales experience and are also qualified for the foreign business. The same need is noted by the Allied Machinery Company, another subsidiary. To meet the shortage recent graduates of the American technical schools are put through a regular course in the factories and in the sales departments of the manufacturers which the company represents. As these men complete this course, they are brought to the New York office to become familiar with home office organization methods and policies. They are then sent to one of the foreign branches to take up such special work as the results they have shown during their training indicate they are best fitted to do.

The annual report of the Gulf States Steel Company covering operations for the calendar year 1916 shows net earnings for stockholders after liberal depreciation and reserves of \$2,452,510, an increase of about 500 per cent over 1915.

The Round Valley Tungsten Company, Bishop, Cal., will install an electric furnace to make ferrotungsten.

## LARGEST ORDER FOR SHIPS

### Contracts for United States Battle Cruisers and Scout Cruisers Total Over \$111,000,000

WASHINGTON, March 20, 1917.—The Secretary of the Navy on March 15 awarded contracts for 10 capital ships at an estimated cost for hulls and machinery alone of \$111,500,000, being the largest order ever given in this or any other country. These ships include four battle cruisers and six scout cruisers, leaving to be contracted for of the authorized building program but three dreadnaughts, 38 submarines, 15 destroyers and a few auxiliaries. Bids for the destroyers will be opened April 4 and for the submarines on April 11. The four battle cruisers were awarded, on the basis of cost plus 10 per cent profit, to the Newport News Shipbuilding & Dry Dock Company, two ships, and to the Fore River Shipbuilding Corporation and the New York Shipbuilding Company, one ship each. Two of the scout cruisers were awarded to the Seattle Construction & Dry Dock Company, Seattle; two to the Union Iron Works, San Francisco, and two to the William Cramp & Sons Ship & Engine Building Company, Philadelphia.

The battle cruisers were originally appropriated for in the naval act for 1917 with a maximum cost limit of \$16,500,000, but the Government found it impossible to secure bids within this figure, whereupon Congress raised the limit to \$19,000,000. Negotiations between the Department and the leading shipbuilders were then undertaken, as the result of which contracts were awarded on a cost-plus-profit basis with the understanding, according to an official statement issued by Secretary Daniels, that "the representatives of the Navy Department are to have the right to require the contractors to employ at all times the maximum number of men that can be utilized to push the work." The Secretary expresses the hope that the four cruisers will be finished in about three years, which will be a construction record, in view of the fact that these ships are the largest, fastest and most costly ever built in this or any other country. It should be said in this connection that Congress authorized the Secretary of the Navy to pay a bonus of 20 per cent to secure early deliveries and in addition the President has unlimited funds at his disposal to expedite construction.

For the six scout cruisers the following bids were made:

Seattle Construction & Dry Dock Company, one vessel in 30 months, for \$5,975,000; a second vessel at \$6,000,000.  
Fore River Shipbuilding Corporation, two vessels, one in 30 months and one in 31 months, for \$5,996,000 each.  
Union Iron Works, two vessels according to modified plans, for \$6,000,000 each.  
William Cramp & Sons Ship & Engine Building Company, one vessel in 30 months, for \$6,120,000, or two vessels, one in 30 months and one in 32 months, for \$5,950,000 each.

In making awards on the basis of these bids the department was influenced first by the desirability of placing as many capital ships as possible in the Pacific coast yards and, second, by the fact that the law permits the Government to pay a higher price for vessels built on the Pacific than on the Atlantic, the difference being intended to compensate for the increased cost of transporting material. It is assumed that in placing a scout cruiser with the Seattle Construction & Dry Dock Company at \$6,000,000, making three in all for this company, the department was influenced by the patriotic action of this concern in taking one of the three scout cruisers originally appropriated for at \$5,000,000, a contract which will probably show little if any profit.

It is estimated that in addition to the contract cost of the hulls and engines of the 10 capital ships, for which contracts will be awarded, the Government will be obliged to spend nearly \$25,000,000 for armor, armament and equipment, these items costing \$465,092 for each scout cruiser and \$5,357,810 for each battle cruiser.

With a view to assisting the contractors in keeping down the cost of the battle cruisers and to protect them against loss on the scout cruisers, the Secretary of the

Navy is endeavoring to reach agreements with the contractors who furnish material and equipment to accept a 10 per cent profit. The Secretary is confident he will be able to secure such an arrangement with a sufficient number of manufacturers to distribute the material orders so as to avoid unduly burdening individual concerns.

Experts of the Navy Department are now working on a plan to secure the speedy construction by contract of 100 or more high-speed coast patrol boats of a new type for scouting against submarines. The designs for these boats call for a craft 110 ft. long, propelled by powerful steam engines, to be much more seaworthy and have a greater cruising radius than the standard submarine chaser, which is an 85-ft. gasoline motor-boat, large numbers of which have been supplied to the British Government.

During the past week a number of builders of wooden ships in various parts of the country have conferred with the Federal Shipping Board to devise a means of constructing as speedily as possible a large fleet of American vessels of moderate size for the transatlantic trade. Just how far the board can go in the development of this project will probably be determined in the course of a few days.

W. L. C.

## Shipbuilding Expansion in Canada

TORONTO, March 14, 1917.—Shipbuilding in Canada by the British Government, through the Imperial Munitions Board, Ottawa, is being vigorously developed. New large plants on the Atlantic and Pacific coasts are being arranged for, and, in addition to the regular subsidies already provided for by statute, it is reported that the government has under consideration the granting of a subsidy for the shipbuilding end. A large amount of raw material has already been secured, and options have been taken on more. The material will be divided up among the various contractors as the need arises. In the war vote placed by the Canadian Parliament last month, there was an item of \$17,000,000 for naval defense. The greater part of this, it is understood, goes toward the construction, for the most part in Canada, of coast patrol and other naval vessels. Commercial craft will be of various tonnage and adapted for various uses. The extent of the orders is limited only by the capacity of the Canadian yards to turn out what is required. The arrangements are under the direction of J. W. Norcross, head of the Canada Steamships, Ltd. The tonnage which is expected to build in Canada in the course of the next two years will probably entail an expenditure of \$100,000,000.

Negotiations are in progress with a view to introducing the manufacture of steel plates and structural steel for ships in Canadian plants. At present Canadian steel companies produce only the lighter forms of structural steel and roll no steel plates. They have, moreover, been largely engaged in filling orders for steel for munitions, a demand which will cease with the end of the war; indeed, it is stated, an intimation has already been received that the output of large shells may be curtailed because the great industrial development in Great Britain makes it possible to produce there a sufficient quantity of those projectiles to meet requirements. If the rolling of ship plates and structural shapes should be undertaken by Canadian firms they may become permanent features of the Dominion's industrial activities. The plans for stimulating shipbuilding in Canada look forward to next year's program as well as this year's.

S.

## Fabricated Steel Business in February

The records of the Bridge Builders and Structural Society, as collected by George E. Gifford, its secretary, show that 59 per cent of the capacity of the bridge and structural shops of the country was put under contract in February. This compares with 61½ per cent for January. The rate of contracting for the two months of this year has been about 108,500 tons per month, against 116,500 tons in the last six months of 1916.

Naval War Preparations

WASHINGTON, March 20, 1917.—The sinking by German submarines of American merchant vessels without warning, with the consequent loss of American lives, has resulted in a marked stimulation of war preparations. President Wilson has certified to the Secretary of the Navy that an emergency exists justifying the immediate use of the large fund provided by Congress, and \$115,000,000 has been placed at the disposal of the Navy Department for this purpose. The President has also suspended the operation of the eight-hour law in the Government navy yards and in all private plants where work for the navy is progressing.

In addition to the contracts for the construction of warships placed March 14, orders have been issued to the commandant of the New York Navy Yard to begin work on 60 submarine chasers to be finished in 60 to 80 days, and the Department is now seeking to purchase engines to equip them. Bids will be opened at the Navy Department March 21 for 200 additional submarine chasers, and a canvass is being rapidly made of all the builders of small boats in the country to determine their capacity for the construction of vessels of this type.

W. L. C.

Brazil's Large Manganese Ore Output

Brazil's output of manganese ore in 1916 surpassed all records. The production for the last 5 years is given by the *Engineering and Mining Journal*, as reported by the Brazilian Bureau of Commercial Statistics and published in the *Jornal do Commercio*, as follows:

Year	Metric Tons
1912.....	154,870
1913.....	122,300
1914.....	183,330
1915.....	288,671
1916.....	503,130

While 1915 showed a decided increase over 1914, due to the cutting off of European supplies of the ore, the output in 1916 was almost double that of 1915 and nearly triple it in value, the 503,130 tons having a valuation at Rio de Janeiro of about \$7,180,000, or more than \$14 per ton.

The Master Sheet Metal Contractors' Association of Wisconsin, in annual convention at Milwaukee last week, elected the following officers: President, Otto Geussenhainer, Sheboygan, Wis.; first vice-president, E. B. Tonnsen, Milwaukee; second vice-president, C. W. Pansch, Racine; third vice-president, G. G. Jones, Racine; fourth vice-president, F. Diedrich, Fond du Lac; fifth vice-president, F. Drews, Racine; secretary, Paul L. Biersach, 220 Fifth Street, Milwaukee; treasurer, R. F. Jeske, Milwaukee; sergeant-at-arms, Paul Wolff, Racine. It was stated in addresses before the convention that the sheet metal business in Wisconsin has increased approximately 100 per cent during the past year.

At the annual meeting of stockholders of the Lackawanna Steel Company held March 14 at Lackawanna, N. Y., the following directors were elected: John Henry Hammond, H. G. Dalton, George W. Burleigh, E. A. S. Clarke, Edwin S. Marston, Ogden L. Mills and C. H. McCullough, Jr. At a special meeting of the stockholders held March 1 the directors were reduced from 21 to 15. The directors dropped at the annual meeting were R. F. Howe, Hamilton F. Keane, Percy R. Pyne, H. R. Taylor, F. F. Graham, D. J. Hancy and W. J. Wilson.

The Canada Department of Mines, Ottawa, reports the total production of pig iron in the Dominion in 1916, not including the output of ferroalloys, as 1,043,979 gross tons. It was slightly greater than that of any previous year. The production of ferroalloys, chiefly ferrosilicon, but including also ferrophosphorus and ferromolybdenum, all made in electric furnaces, was 28,628 tons, as compared with a production in 1915 of 10,794 tons.

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At the regular monthly meeting of the Newark Foundrymen's Association, Newark, N. J., March 7, H. Cole Estep, Cleveland, editorial director of the Penton Publishing Company, publisher of *The Foundry*, read a paper entitled "How Some Cleaning Room Problems Have Been Solved." Mr. Estep's remarks, which were accompanied by about 30 lantern slides, covered methods of cleaning castings in gray-iron, steel, malleable and non-ferrous metal foundries. Various types of cleaning room apparatus, including tumbling mills, sand-blasting appliances, etc., were described and illustrated.

# United States Steel Corporation 1916 Report

Gross Receipts Increased \$504,790,190  
Over 1915 or 67 Per Cent—Net Earnings In-  
creased \$203,178,166 or About 156 Per Cent

The fifteenth annual report of the United States Steel Corporation, covering the operations of the year ended Dec. 31, 1916, is by far the best that has been issued in the history of the company. When the huge net earnings of the year are studied, it seems hardly possible that the report for so recent a year as 1914 had disclosed a deficit of \$16,971,983 after paying the full preferred dividend and only 3 per cent on the common stock. In 1916, after paying the full preferred dividend and 10 per cent on the common, a surplus was left of \$201,835,584. The gross receipts of the year, represented by the huge figures, \$1,231,473,779, far surpass anything before realized, exceeding 1913, the largest previous year, by \$434,579,480. Shipments to customers of all classes of products, except cement, in 1916 were 14,933,621 tons, which was an increase of 3,950,873 tons on 1915. The following is a comparison of the financial outcome of the year with the preceding year:

Income Account		
	1916	1915
Gross receipts, sales and earnings .....	\$1,231,473,779.47	\$726,683,589.33
Manufacturing cost and ordi- nary maintenance .....	810,501,469.69	544,352,757.08
Administrative and general expenses .....	24,458,377.08	19,396,905.42
Taxes .....	26,599,720.90	13,640,184.56
Discounts and interest .....	6,202,650.47	3,757,590.15
Balance .....	363,711,561.33	145,536,152.12
Sundry manufacturing and operating revenues and rentals .....	4,730,146.59	3,504,226.04
Income from investments, etc. ....	6,434,459.49	3,472,790.17
Total income .....	374,876,167.41	152,513,168.33
Interest charges subsidiary companies and contingent reserves .....	25,476,278.78	9,854,054.69
Balance .....	349,399,888.63	142,659,113.64
Net balance profits earned by subsidiary companies .....	—15,825,711.13	—12,263,102.00
<b>Net earnings .....</b>	<b>333,574,177.50</b>	<b>130,396,011.64</b>
Depreciation funds, etc. ....	39,547,612.65	32,428,048.85
Balance .....	294,026,564.85	97,967,962.79
Bond interest and sinking fund .....	22,619,803.58	22,899,944.02
Balance .....	271,406,761.27	75,068,018.77
Sundry credit adjustments .....	+124,969.11	+765,813.94
Total available for divi- dends, etc. ....	271,531,730.38	75,833,832.71
Preferred dividends paid .....	25,219,677.00	25,219,677.00
Common dividends paid .....	44,476,468.75	6,353,781.25
Surplus .....	\$201,835,584.63	\$44,260,374.46

## Classification of Business

The following is a statement of the gross sales and earnings classified by operating groups, the gross sales of products being included on basis of f. o. b. mill values:

	1916	1915
By manufacturing, iron-ore and coal and coke companies:		
To customers outside of U. S.		
Steel organization .....	\$853,264,457	\$486,352,054
Inter-company sales (between subsidiary companies) .....	297,274,541	178,576,468
	\$1,150,538,998	\$664,928,522
Transportation and miscellaneous companies:		
Transportation companies .....	71,367,649	54,392,457
Miscellaneous companies .....	9,567,132	7,362,610
Total .....	\$1,231,473,779	\$726,683,589

\*Includes earnings and receipts both for inter-subsidiary company business and of business with interests outside of the U. S. Steel organization.

## Condensed Balance Sheet

Following is a condensation of the general balance sheet as of Dec. 31, 1916, liabilities from one subsidiary

company to another being omitted from both assets and liabilities:

Assets	
Property account .....	\$1,472,623,666.65
Advanced mining royalties .....	48,678,087.25
Mining royalties for which non-interest bearing notes of subsidiary companies have been issued .....	24,925,557.33
Deferred charges applying to future operations	1,618,062.64
Investments .....	3,548,202.81
Sinking and reserve fund assets .....	60,483,524.39
Inventories, less credit for reserve and for values representing profits earned by sub- sidiary companies on inter-company sales ..	181,901,004.67
Accounts receivable .....	83,441,821.11
Bills receivable .....	5,146,805.91
Agents' balances .....	1,059,102.52
Sundry marketable securities .....	40,337,583.42
Time bank deposits and secured demand loans	40,869,794.20
Cash in hand and subject to check .....	148,394,761.44
Total .....	\$2,083,027,974.36

Liabilities	
Common stock .....	\$508,302,500.00
Preferred stock .....	360,281,100.00
Outstanding stock of subsidiary companies ..	505,042.50
Bonded and debenture debt outstanding .....	603,471,026.74
Subsidiary companies' non-interest bearing notes substituted for previously existing mining royalty obligations .....	24,925,557.33
Mortgages and purchase money obligations of subsidiaries .....	902,289.46
Accounts payable and payrolls .....	41,065,936.27
Accrued taxes not yet due .....	22,171,540.47
Accrued interest, unrepresented coupons and un- claimed dividends .....	8,150,965.49
Preferred dividend No. 63, payable Feb. 27, 1917 .....	6,304,919.25
Common dividend No. 49, payable March 30, 1917 .....	15,249,075.00
Sundry reserve funds .....	55,337,108.48
Appropriated surplus to cover capital expend- itures .....	55,000,000.00
Surplus exclusive of profits earned by sub- sidiary companies on inter-company sales of products on hand in inventories .....	381,360,913.37
Total .....	\$2,083,027,974.36

The surplus shown in the above balance sheet is exclusive of \$35,935,434.52 in the hands of subsidiary companies, representing profits accrued on inter-company sales.

## Shipments—Domestic and Export

The shipments of all classes of products to customers in 1916, in comparison with the shipments in 1915, were as follows:

	1916	1915
Domestic—tons		
Rolled steel and other finished products	13,075,295	9,331,363
Pig iron, ingots, spiegel, ferro and scrap	524,885	543,193
Iron ore, coal and coke .....	1,172,958	1,004,322
Sundry materials and by-products .....	160,483	103,869
Total tons all kinds of material, except cement .....	14,933,621	10,982,748
Universal Portland cement (bbls.) .....	10,861,426	8,176,583
Export—tons		
Rolled steel and other finished products	2,466,793	2,350,524
Pig iron, ingots and scrap .....	32,636	78,244
Sundry materials and by-products .....	2,198	971
Total tons all kinds of materials .....	2,501,627	2,429,739
Aggregate tonnage of rolled steel and other finished products shipped to both domestic and export trade ..	15,542,088	11,681,887
Total value of business (covering all of above tonnage):		
Domestic .....	\$702,801,167	\$391,188,661
Export .....	150,463,290	95,163,392
Total .....	\$853,264,457	\$486,352,054

The active demand for iron and steel products for both the domestic and export trade, which prevailed at the opening of 1916, continued during the entire year. These demands exceeded the capacities of the mills and, consequently, prices advanced throughout the year. The tonnage of unfilled orders of the subsidiary companies at Dec. 31, 1916, was 11,547,286 tons of rolled steel products, the highest ever recorded in the history of the corporation, and exceeding by 3,741,066 tons, or 47.9 per

rent, the unfilled tonnage at the close of 1915. The character of the order book is excellent. The bulk of the tonnage covers the needs of buyers for definitive contract work or their requirements for operation and maintenance, thus encouraging the belief that the operation of the mills at their full capacity will be continued for at least the greater part of 1917. The export sales were for cash, and domestic sales were either for cash or on thirty to sixty day terms in accordance with the custom of the trade as to various commodities. Collections have been unusually good.

#### Production for the Year

The production of raw, semi-finished and finished products by subsidiary companies in the year 1916, compared with 1915, was as follows:

Products	1916	1915
Iron ore mined—Lake Superior Region:		
Mesaba Range .....	24,928,039	17,269,664
Vermilion Range .....	1,314,002	1,273,825
Gogebic Range .....	2,369,460	1,277,419
Menominee Range .....	996,983	939,304
Marquette Range .....	647,132	618,108
In the Southern Region:		
Tennessee Coal, Iron & R. R. Company's Mines .....	3,099,553	2,351,356
Total .....	33,355,169	23,669,676
Limestone quarried .....	7,023,474	5,795,925
Coal mined:		
For use in manufacture of coke .....	26,606,041	20,800,204
For steam, gas, etc. ....	6,162,340	5,828,278
Total .....	32,768,381	26,628,482
Coke manufactured:		
In beehive ovens .....	12,479,160	9,701,692
In by-product ovens .....	6,422,802	4,799,126
Total .....	18,901,962	14,500,818
Blast-furnace production:		
Pig iron .....	17,412,049	13,517,598
Spiegeleisen .....	31,486	7,175
Ferromanganese and ferrosilicon .....	164,102	116,735
Total .....	17,607,637	13,641,508
Steel ingot production:		
Bessemer ingots .....	7,273,766	5,584,198
Open-hearth ingots .....	13,636,823	10,792,294
Total .....	20,910,589	16,376,492
Rolled and other finished steel products for sale:		
Steel rails (heavy, light and girder) .....	1,533,681	1,129,832
Blooms, billets, slabs, sheet and tin-plate bars .....	1,881,526	1,404,443
Plates .....	1,332,262	974,741
Heavy structural shapes .....	1,029,682	726,082
Merchant steel, bars, hoops, bands, skelp, etc. ....	2,715,277	2,118,366
Tubing and pipe .....	1,338,892	919,280
Wire rods .....	278,197	261,036
Wire and products of wire .....	2,004,494	1,771,945
Sheets (black and galvanized) and tinplates .....	1,786,642	1,368,178
Finished structural work .....	557,953	476,896
Angle splice bars and other rail joints .....	277,271	190,758
Spikes, bolts, nuts and rivets .....	95,096	74,289
Axles .....	173,530	95,476
Steel carwheels .....	107,167	77,569
Sundry steel and iron products .....	349,122	173,748
Total .....	15,460,792	11,762,639
Spelter .....	55,898	32,031
Sulphate of iron .....	46,263	35,377
Universal Portland cement .....	10,425,600	7,648,658

#### Employees and Payrolls

The average number of employees in the service of all companies during the year 1916, in comparison with the year 1915, was as follows:

	1916	1915
Manufacturing properties .....	187,289	140,875
Coal and coke properties .....	25,143	19,485
Iron-ore properties .....	12,624	9,668
Transportation properties .....	24,189	18,240
Miscellaneous properties .....	3,423	2,858
Total .....	252,668	191,126
Total salaries and wages paid .....	\$263,385,502	\$176,800,864
Average per employee per day:		
All employees, exclusive of general administrative and selling force .....	\$3.29	\$2.92
Total employees, including general administrative and selling force .....	3.36	3.01

#### Inventories

The following is a general classification of the inventory valuations at Dec. 31, 1916, in comparison

with the valuations at the close of the preceding year:

	1916	1915
Ores—iron, manganese and zinc .....	\$50,021,287	\$45,532,472
Pig iron, scrap, ferro and spiegel .....	18,581,072	9,075,586
Coal, coke and other fuel .....	4,168,595	4,925,090
Pig tin, lead, spelter, copper, nickel, aluminum and dross and skimmings .....	10,415,759	7,866,748
Limestone, fluxes and refractories .....	3,904,814	3,011,134
Rolls, molds, stools, annealing boxes, etc. ....	7,814,775	6,638,562
Manufacturing supplies, stores and sundry items not otherwise classified .....	23,908,526	17,343,454
Ingots—steel .....	1,930,101	1,790,298
Blooms, billets, slabs, sheet and tin-plate bars, etc. ....	11,659,281	11,658,042
Wire rods .....	893,491	953,535
Skelp .....	1,566,349	1,824,779
Finished products .....	30,612,642	31,091,145
Mining supplies and stores (for ore and coal properties) .....	4,083,029	2,851,564
Railroad supplies and stores .....	5,941,113	3,767,177
Merchandise and supply companies .....	962,945	674,527
Material, labor and expense locked up in bridge and structural contracts .....	\$41,939,697	
Less, bills rendered on account .....	37,673,716	
	4,265,981	1,996,438
Stocks abroad and on consignment .....	9,738,287	6,857,423
Material in transit .....	4,957,751	3,255,926
Total .....	\$195,425,798	\$161,113,900
Less, reserve for amount of actual cost or market value of stocks in excess of normal prices therefor .....	13,524,794	
Balance .....	\$181,901,004	\$161,113,900

#### General

During the year 1916 a total of \$12,993,956 of bonds, mortgages and purchase money obligations of the corporation and its subsidiaries was paid off. Of this total \$9,641,000 was redeemed through the sinking funds of the mortgages securing the bonds. There were also paid off \$1,157,203 of mining royalty notes of subsidiary companies which had been issued and substituted for previously existing royalty obligations under mining contracts. In addition there were paid and discharged liabilities of \$992,187 for special deposits or loans made with or to subsidiary companies. No new issues of bonds, mortgages or purchase money obligations were sold to the public during the year.

The expenditures during the year on corporation account for additions to the properties and new construction and for stripping and development work at mines aggregated \$59,563,983. The total expenditures made for these properties since the organization of the corporation aggregate \$553,377,684.

The Duluth plant of the Minnesota Steel Company was completed in the early part of the year in accordance with original plans, and all departments were placed in operation. The output of the plant in 1916 was 242,972 tons of rolled steel products of various classes, or about two-thirds the rated full annual capacity of the plant. The new cement plant constructed by the Universal Cement Company, and adjoining the Minnesota steel plant, was also put into operation during the year, producing 710,600 barrels of cement in 1916.

On account of the construction of new by-product coke plants at Clairton and New Castle, Pa., and at Youngstown, Cleveland and Lorain, Ohio, expenditures of \$3,695,554 were made during the year. These five plants when completed will have an aggregate of 1488 ovens.

In the Pittsburgh district, at Edgar Thomson works, there has been installed a central pumping station and water distributing system; at open hearth plant No. 3 of Homestead works, a 1500-ton hot metal mixer; at Schoen steel wheel works, an additional unit increasing the capacity by 150,000 wheels per annum; at Clairton works, the installation of two additional open hearth furnaces and a 1200-ton hot metal mixer; at Donora works, the construction of a duplexing steel plant, including two 25-ton Bessemer converters and a 300-ton hot metal mixer. Additional expenditures were also made at the Donora zinc smelter plant for the installation of muriatic acid and zinc oxide departments, and the finishing up of the final construction of the spelter plant. The output of the Donora plant in 1916 was 22,800 tons of spelter, 108,277 tons of sulphuric acid and 5624 tons of muriatic acid.

In the Valley districts, at Youngstown, Ohio, there were completed three additional open-hearth furnaces, and substantial progress was made in the construction of the new McDonald merchant bar plant, which is to comprise 10 mills of various types and sizes; at Farrell, Pa., three additional open-hearth furnaces were installed. At Ellwood City, Pa., work was actively prosecuted in the enlargement and extension of the seamless tube plant of the Shelby Steel Tube Company.

In the Cleveland district, at the Cuyahoga works of the American Steel & Wire Company, there was completed a new rod mill and there were installed additional wire-drawing buildings with equipment; and work is progressing on the construction of a new rolling mill for hot and cold rolled flats. At Lorain works of the National Tube Company, four new open-hearth furnaces were completed, and work is in progress on the construction of two additional furnaces and a new 40-in. blooming mill.

In the Chicago district, the Indiana Steel Company at Gary made substantial progress in the construction of four new blast furnaces, a duplexing steel plant, including two 25-ton Bessemer converters and two tilting open-hearth furnaces; a 40-in. blooming mill, 160-in. sheared plate mill, three merchant mills and new forged steel wheel plant; and the American Sheet & Tin Plate Company practically completed the construction of a new tin-plate plant of 24 hot mills. At the South Chicago plant of the Illinois Steel Company, progress was made in the installation of a duplexing steel plant of two 25-ton Bessemer converters and two 100-ton tilting open-hearth furnaces; also in the construction of an electric steel plant of two 20-ton furnaces, one tilting open hearth furnace, forging presses, etc.

During the year the subsidiary railroad companies purchased or constructed additional equipment consisting of 84 locomotives, 3471 freight cars and 34 road cars of various kinds, the aggregate cost of which was \$6,908,177.

There were purchased and placed in commission during the year on the Great Lakes two 12,700-ton capacity and six 6500-ton ore carrying vessels; also one supply boat. The total cost of these vessels, together with payments made in 1916 on account of cost of four additional 12,700-ton steamers deliverable in 1917, was \$3,517,496.

At the close of 1916 the amount unexpended on authorized appropriations for extensions, additions and betterments, including iron ore mine stripping operations for 1917, was approximately \$137,000,000. It is estimated that about \$100,000,000 of this total will be expended in 1917. These authorizations cover the outlays yet to be made to complete the important improvements herein described as in course of construction at the close of the year, also several important new extensions and additions, as well as a wide range of miscellaneous work.

The principal new extensions and additions authorized and not heretofore mentioned are the following: The contemplated construction at Gary of a tube plant, the plans for which have not yet been fully developed, but which will comprise blast furnaces and steel works as well as finishing mills. At the Edgar Thomson works of Carnegie Steel Company extensive improvements are to be made to the blast-furnace plant; at Duquesne works a new 12-in. bar mill will be installed; at Farrell works the billet and bar mills are to be reconstructed; extensions are to be made to the tin-plate plants at Shenango and Farrell works. A complete complement of equipment is to be put in service for use in hauling coal on river from mines to the new by-product coke plant at Clairton, and a pipe line is to be installed for conveying gas from this plant to steel plants in the Pittsburgh district. The Duluth, Missabe & Northern Railway Company is constructing at Duluth, a new steel ore dock of 384 pockets. There have been ordered by the subsidiary railroad companies, for delivery to them in 1917, additional equipment aggregating 31 locomotives and 3195 steel cars.

In January, 1917, there was offered to the employees of the corporation and of the subsidiary companies the privilege of subscribing for shares of common stock of the corporation, at \$107 per share. Subscriptions were received from 39,072 employees for an aggregate

of 67,410 shares. The conditions attached to the offer and subscription, aside from the feature of price, were generally similar to those under which stock has been heretofore offered to employees. The usual distribution of special compensation to employees under the plan adopted in 1903 was also made.

The trustees of the United States Steel and Carnegie Pension Fund disbursed during 1916, in pensions to retired employees, \$711,130.33. Pensions were granted to 275 retiring employees. At the close of the year there were 3013 names on the pension rolls. The average age at which pensions have been granted to retiring employees since the inauguration of the plan is 65.33 years, and the average term of service rendered by such pensioners was 29.93 years.

The total amount expended by the corporation and the subsidiary companies during the year for safety work was \$848,080, in comparison with \$608,644 expended in the previous year. The number of fatal accidents in 1916, based on the number of accidents per 100 employees, was 44.46 per cent less than 1906; and the number of fatal and serious accidents combined was 31.60 per cent less than in 1906.

The total amount disbursed by all the companies in 1916 in connection with work accidents was \$2,593,960. Of this amount 88 per cent was paid directly to the injured employees or their families or in taking care of them. The compensation laws of the several States, which have been promptly accepted by the subsidiary companies, merely established the principles upon which the voluntary relief plan, regardless of legal liability, had been previously inaugurated by the corporation.

The amount expended during the year for sanitary work in and about the mines and mills was \$1,402,798, in comparison with \$953,056 in the previous year. The sum of \$322,595 was expended for protection of water supply and drinking water systems for the use of employees. During the year there were installed 313 additional showers and 10,662 lockers.

The efforts of the corporation and the subsidiary companies toward the improvement of the material welfare of employees and their families have been continued. During the last summer the area of gardens maintained by employees on the companies' lands covered nearly 1000 acres. At present there are maintained 17 clubs for employees with a membership of 5242; also 137 playgrounds, 125 athletic parks and 8 swimming pools, all of which have either been constructed by the subsidiary companies or in the construction of which they have materially assisted.

### Barrett Company Earnings

A report covering the operations of the Barrett Company, New York City, for the year ended Dec. 31, 1916, shows gross earnings of \$9,547,604, an increase of \$2,894,965 over the previous year. Profits before the payment of dividends were \$4,256,629, a gain of \$1,766,665. Preferred dividends amounting to \$333,249 were paid, leaving a balance of \$3,914,608, which is equal to 32.1 per cent on \$12,089,100 outstanding common stock as compared with 21.19 per cent earned in 1915.

At a special stockholders' meeting an increase in the preferred stock from \$5,000,000 to \$12,500,000 and in the common from \$15,000,000 to \$25,000,000 was authorized. Preferred stockholders will be given an option based on 30 per cent of their holdings at par, while common stockholders may subscribe to 20 per cent of their holdings in new common and 10 per cent in new preferred.

The Crocker-Wheeler Company, Ampere, N. J., reports its net earnings as having broken the record for February, being greater than in any February since the founding of the company 28 years ago. It is further stated that the bookings continue good, and this represents straight electrical business, as the company, after completing several highly profitable munition contracts, has returned to the exclusive manufacture of electrical equipment.

## LAKE ORE MINERS GO SOUTH

### Members of Lake Superior Mining Institute Visit Birmingham, Ala.

BIRMINGHAM, ALA., March 17, 1917.—With ideal spring weather enabling them to thoroughly enjoy the open air and gain the most advantageous view of mining and mill operations, the members of the Lake Superior Mining Institute spent from Tuesday to Friday of last week in the Birmingham district, Alabama. A committee of 70 citizens prominent in the industrial affairs of the district took them in charge upon arrival and made their stay both pleasant and illuminating. This committee was headed by C. T. Fairbairn, Southern manager of the Republic Iron & Steel Company, and Mr. Fairbairn was elected president of the organization. A. J. Yungbluth, Ishpeming, Mich., remains secretary for another term.

At the session on Thursday, March 15, the Institute went on record in condemning the enlistment army system as inefficient and undemocratic, as well as being contrary to the experience of practically every civilized nation of the world and indorsed universal military training with compulsory army and navy service along the lines recommended by the general army board, and that the President should affix his signature to a law providing for such without delay. Outside of this, the Institute spent its time inspecting plants and listening to the papers that were read at the two sessions held for that purpose. The papers read were the following:

Mining Methods on the Menominee Iron Range, by C. H. Baxter, Rudolph Ericson, and M. E. Richards, committee.

Methods of Mining at the Chapin Mine, by W. C. Gordon, Iron Mountain, Mich.

The Block-Caving System Used at the Pewabic Mine, by A. J. Myers, Iron Mountain, Mich.

The Method of Mining Used at the Loretto Mine, by C. H. Baxter, Loretto, Mich.

Mining Methods in the Iron River District of Michigan, by Rudolph Ericson, Iron River, Mich.

The Methods of Opening and Mining the Davidson No. 2 Mine, by Rudolph Ericson, Iron River, Mich.

The Sub-Stoping Method of Mining as Used at the Chatham Mine, by F. J. Smith, Iron River, Mich.

Mining Methods in the Crystal Falls, Amasa and Florence districts, by M. E. Richards, Crystal Falls, Mich.

Sub-Stoping at the Amasa-Porter Mine, by M. E. Richards, Crystal Falls, Mich.

Mining Methods in the Florence District, by J. M. Riddell, Florence, Wis.

Herringbone Gears Used on Pumps, by Fred M. Prescott, Menominee, Mich.

Mine Accidents Classified by Mining Methods for the Lake Superior District, by Albert H. Fay, Washington, D. C.

The Founding of the Calumet & Hecla Mine, 1866-1916.

Electric Power in Mining on the Menominee Range, by Charles Harger, Iron Mountain, Mich.

Reminiscences of the Development of the Lake Superior Iron Districts, by John M. Longyear, Marquette, Mich.

Equipping and Sinking No. 1 Shaft at the Holmes Mine, by Lucien Eaton, Ishpeming, Mich.

Crushing Plant at Brier Hill Shaft, by Floyd L. Burr, Vulcan, Mich.

Notes on the Calumet & Hecla Mine Fire, by John Knox, Jr., Calumet, Mich.

Mining Methods of the Bristol Mine, by Arvid Bjork.

One of the first things done by the Institute was the sending of greetings to Dr. Nelson P. Hulst, of Milwaukee, its first president, who has just passed his seventy-fifth year.

The visitors enjoyed their first day exceedingly. They arrived in the city early, were met at the depot by their hosts, and at once started on a tour of the district in a special train. At noon a Southern barbecue was served on the bank of the impounding dam of the Tennessee Coal, Iron & Railroad Company at Bayview. Motor-boat riding was a pleasant experience on the surface of this lake, which has a capacity of 5,000,000,000 gal. of water, utilized by the company at its various plants. A stop was made on the outskirts of Birmingham, at Ishkooda, where the largest red ore mine in the Southern States is operated by the Tennessee Company. Several of the model mining towns of this company were visited. All are electrically lighted, the streets are hard surfaced, there are schools and churches

and the company stores are up to date in every respect. The Tennessee Company has its own school superintendent, its own mine inspecting force, etc. The new coal mines have concrete shafts and slopes.

The Tennessee Company's rail mill, open-hearth furnaces, by-product works and slag fertilizer plant and the wire mill of the American Steel & Wire Company, all within sight of one another, were visited. The furnace plant of the Republic Iron & Steel Company is almost in the range of vision and that also was inspected. The plants of the Sloss-Sheffield Steel & Iron Company, Woodward Iron Company and, in fact, all the large industries, were visited. They are so close to one another, all in the county of Jefferson, that they almost touch. The visitors also had a glance at the canalized Warrior River, which is navigable to the Gulf of Mexico from a point a few miles from the Ensley furnaces.

The golf clubs received attention from time to time, and several informal affairs at the various city clubs served to entertain the Lake Superior people in the evenings. However, the institute spent the far greater portion of time in trips around the district and looking at the mines and mills and thus obtained a highly appreciated insight into the Birmingham district.

There were about 150 representatives of the Institute in the party, many of whom were accompanied by their wives. All were profuse in their thanks for the bounteous hospitality extended by their Southern hosts. Fearful lest a railroad strike should tie them up, the officers of the Institute called off the proposed visit to Knoxville and the party started North on Friday morning.

The new president, Mr. Fairbairn, is one of the charter members of the Institute and has taken an active part in it for 25 years. For several years he was in charge of the Winthrop Company's interests at Ishpeming, and afterward became connected with the Republic Iron & Steel Company. In 1911 he went to Birmingham as manager of the company's Southern properties and has been in charge ever since. Under his regime these plants have been greatly improved and their operations extended. R. F. J.

### Mixing Blast-Furnace and Coke-Oven Gas

A novel German suggestion is to lead blast-furnace gas directly into the coke oven above the coke, so that the hot gases may react with one another, though mixtures of cold blast-furnace gas and coke-oven gas have previously been utilized. According to *Engineering*, London, experiments of this kind have recently been made by Dr. W. Zimmermann, of Worms, and the resulting gas, which he calls compound gas (*verbundgas*) is said to differ in composition from the constituents, containing less carbon dioxide and free nitrogen, more hydrocarbons, both light and heavy, and more ammonia, and to be of higher calorific value. The addition of the blast-furnace gas, Dr. Zimmermann suggests, lowers the temperature in the coke oven, so that the distillation takes place at a lower temperature and less ammonia is decomposed.

The experiments, described in *Stahl und Eisen*, June 15, 1916, pages 573-581, were made in works in which an Otto oven was placed at Dr. Zimmermann's disposal; the gain in calorific power ranged from 8 to 13.6 per cent, the gain in ammonia amounted to 25 per cent. It would thus appear possible to use profitably a mixture of coke-oven gas and blast-furnace gas, prepared as indicated, in steel making, and the consequent advantage would be important, especially near towns, where coke-oven gas can always be utilized. The additional gain of ammonia, as sulphate, would also be important.

For the purpose of more readily supplying the requirements of the automobile trade throughout New England the Post & Lester Company, Hartford, Conn., has been appointed distributor of S K F ball bearings. With branch houses in Boston, Bridgeport, New Haven, New London, Providence, Springfield, Waterbury and Worcester, the Post & Lester Company will be able to supply radial and thrust bearings from stock.

# Iron and Steel Markets

## PRICES AGAIN ADVANCED

### Buying Pressure Crowds Big Bookings

Renewed Russian Demands Expected—Billet Sales Pressing—Plates Still Stronger

Prices are undeniably the main concern of the iron and steel trade. This week, like those preceding, marks further advances. Those already made have been fairly well tested and there is nothing discernible that is calculated to reduce them for many months unless it be a lack of balance in respect to the new capacity being completed from time to time.

International conditions have, if anything, stimulated demand. Foreign bidding for materials seems not to have diminished in any particular and many domestic consumers are eager to secure forward protection. With mills booked for months with definite business, all of it substantially irrevocable, it is not surprising that pressure from buyers forces large price jumps nor that mills are disinclined to take on the usual so-called domestic contracts which, with few exceptions, have proved to be mere options of advantage chiefly to the buyer.

What purchasing is abandoned because of high prices, and such is appearing in general building construction, is regarded as a stabilizing influence as representing a definite future demand. The uneasiness accompanying the rapid advances seems to be disappearing. A policy in some recent finished steel sales of requiring the completion of specifications in the last half of this year for material to be delivered in the first half of next serves to remove fears that prices are artificial, though an incentive in making the rise may have been to hold back foreign business and to provide sufficiently for our own Government needs.

As if to pyramid demand, word now comes that the new Russian Government is planning fresh loans to secure cars, locomotives and rails. Then to add to the future backlog may be counted probable increased railroad purchases for trackage, for if recent railroad procedure gives any precedent, recognition of the lack of terminal facilities will follow increasing motive power capacity just as buying on this account came after a shortage in cars seemed to be the one need.

The continued advance in pig iron, covering all grades, is measured this week by \$1 to \$2.50 per ton. Furnaces seem unable to make deliveries for some of the iron under consideration, and thus the proportions of inquiry are enlarged. Alabama foundry iron is now \$30, Birmingham, with some sales at \$31. Withdrawals by some Southern producers are regarded as temporary and forecasting a further advance. The Virginia interest accepting first half of 1918 business has sold 40,000 tons and has put its price to \$33 at furnace. In Pittsburgh, Bessemer iron is up \$1 per ton and foundry iron has been quoted at \$40 for the second half of this year, with \$37 and \$38 done. In Philadelphia 2000 tons of foundry iron has been sold at \$40. A large pump company has bought 23,000 tons for the first half

of next year, some of this equivalent to about \$32. Buffalo; an Eastern steel company has bought in all 58,500 tons of basic and two furnace representatives in Cleveland have sold this month in excess of 100,000 tons.

General advances in ferrosilicons amount to \$5 to \$15 per ton.

Cast iron pipe, reflecting pig-iron strength, is \$2 and \$3 a ton higher in some markets and municipal buying is receiving a check.

These advances may be noted: Spikes, \$5 a ton; shafting about \$5 per ton; splice bars for rails, \$10. That bolt and nut makers will not open books for last half business is taken to mean an advance for deliveries beyond July.

As indicating the possibility that finishing mills are not being completed as rapidly as semi-finished capacity, offerings of over 100,000 tons of billets are noted. One of these proffered sales is, however, for 16,000 tons per month for a year. Sheet bars have sold at \$67 at mill, for a 2000-ton lot, \$2 above the minimum quotation.

Discard steel, for some 5000 tons, has brought \$41 to \$42, for rolling into reinforcing bars, and a widening market for reinforcing purposes is also developing for bar iron.

It is clearer that for deferred deliveries ship plates are differentiated from tank plates as they have been for nearby shipment, the one ranging from 5c. upward and the other from 4½c. Ship shapes are more commonly going at plate prices. No plate sales at 7½c. have yet been noted, but the wider tank plates more generally command 6c.

Export quotations on tin plates are widely divergent. On 20,000 boxes \$10 per base box has been named while on 5000 boxes \$8.75 has been accepted.

In the structural field, high prices have killed 5000 tons of projected work, but about 10,000 tons was driven in in the East to get in under the last advance. For navy and shipyard construction it is estimated that upward of 25,000 tons will be needed for crane runways and machine shops.

## Pittsburgh

PITTSBURGH, PA., March 21, 1917.

Prices on pig iron and all kinds of finished steel are steadily advancing and seem likely to reach much higher figures. It is held that a declaration of war between the United States and Germany would quickly result in our Government's placing heavy orders for steel of various kinds, and which in delivery would take preference over other orders, foreign or domestic, now on the books of the mills. Buyers realizing this are rushing to cover, and the amount of new business they have offered in the last two or three weeks has been much heavier than in any similar period for some months. With the steel mills practically sold up for all of this year on nearly all kinds of semi-finished and finished material, the best that buyers can get are promises of possible deliveries of material in the last quarter of this year, providing the demands of the Government are not too great. The decision of the Supreme Court that the Adamson so-called 8-hr. enactment is legal and the declaring off of the railroad strike are taken to mean that there will be no trouble between railroads and their men for a long time to come. In the past week Bessemer iron was marked up \$1 per ton; higher prices are being

## A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	Mar. 21, 1917.	Mar. 14, 1917.	Feb. 21, 1917.	Mar. 22, 1916.
	1917.	1917.	1917.	1916.
No. 2 X, Philadelphia...	\$39.00	\$36.50	\$32.00	\$20.00
No. 2, Valley furnace...	37.00	36.00	33.00	18.50
No. 2, Southern, Cin'tl...	32.90	31.90	27.40	17.90
No. 2, Birmingham, Ala.	30.00	29.00	24.50	15.00
No. 2, furnace, Chicago*	37.00	35.00	33.00	19.00
Basic, del'd eastern Pa.	35.00	33.50	30.50	19.50
Basic, Valley furnace...	32.00	32.00	30.00	18.25
Bessemer, Pittsburgh...	37.95	36.95	35.95	21.95
Malleable Bess., Ch'go*	37.00	35.00	33.00	19.50
Gray forge, Pittsburgh...	32.95	32.95	31.95	18.45
L. S. charcoal, Chicago...	36.75	36.75	35.75	19.75

Rails, Billets, etc., Per Gross Ton:	Mar. 21, 1917.	Mar. 14, 1917.	Feb. 21, 1917.	Mar. 22, 1916.
	1917.	1917.	1917.	1916.
Bess. rails, heavy, at mill	38.00	38.00	38.00	28.00
O.-h. rails, heavy at mill	40.00	40.00	40.00	30.00
Bess. billets, Pittsburgh...	65.00	65.00	65.00	45.00
O.-h. billets, Pittsburgh...	65.00	65.00	65.00	45.00
O.-h. sheet bars, P'gh...	65.00	65.00	65.00	45.00
Forging billets, base, P'gh	90.00	90.00	90.00	65.00
O.-h. billets, Phila.....	65.00	65.00	70.00	50.00
Wire rods, Pittsburgh...	85.00	80.00	80.00	57.00

### Finished Iron and Steel,

Per Lb. to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Iron bars, Philadelphia...	3.659	3.659	3.159	2.559
Iron bars, Pittsburgh...	3.50	3.50	3.25	2.40
Iron bars, Chicago.....	3.00	3.00	3.00	2.15
Steel bars, Pittsburgh...	3.75	3.75	3.25	2.75
Steel bars, New York...	3.919	3.919	3.419	2.919
Tank plates, Pittsburgh...	5.25	5.25	5.00	3.50
Tank plates, New York...	5.419	5.419	5.169	3.669
Beams, etc., Pittsburgh...	3.75	3.40	3.25	2.50
Beams, etc., New York...	3.919	3.569	3.419	2.619
Skelp, grooved steel, P'gh	3.50	3.50	3.25	2.30
Skelp, sheared steel, P'gh	3.75	3.75	3.50	2.40
Steel hoops, Pittsburgh...	4.00	4.00	3.75	3.00

\*The average switching charge for delivery to foundries in the Chicago district is 50c. per ton.

Sheets, Nails and Wire.	Mar. 21, 1917.	Mar. 14, 1917.	Feb. 21, 1917.	Mar. 22, 1916.
	1917.	1917.	1917.	1916.
Per Lb. to Large Buyers: Cents.	Cents.	Cents.	Cents.	Cents.
Sheets, black, No. 28, P'gh	5.00	5.00	4.75	2.75
Sheets, galv., No. 28, P'gh	7.00	7.00	6.75	4.75
Wire nails, Pittsburgh...	3.20	3.20	3.00	2.40
Cut nails, Pittsburgh...	3.70	3.70	3.70	2.30
Fence wire, base, P'gh...	3.15	3.15	2.95	2.25
Barb wire, galv., P'gh...	4.05	4.05	3.85	3.25

### Old Material, Per Gross Ton:

Iron rails, Chicago.....	\$28.00	\$28.00	\$27.00	\$18.00
Iron rails, Philadelphia...	28.00	28.00	28.00	20.00
Carwheels, Chicago ....	21.00	20.25	18.00	14.50
Carwheels, Philadelphia...	22.50	21.00	20.50	16.50
Heavy steel scrap, P'gh...	22.00	22.00	21.00	19.00
Heavy steel scrap, Phila	24.00	23.50	20.00	17.00
Heavy steel scrap, Ch'go	24.50	24.00	22.00	16.75
No. 1 cast, Pittsburgh...	21.00	20.00	19.00	16.25
No. 1 cast, Philadelphia...	23.00	21.00	20.00	17.00
No. 1 cast, Ch'go (net ton)	17.25	16.50	16.00	13.50
No. 1 RR. wrot, Phila...	32.00	30.00	25.00	22.00
No. 1 RR. wrot, Ch'go (net)	27.00	26.00	24.00	16.50

### Coke, Connellsville, Per Net Ton at Oven:

Furnace coke, prompt...	\$8.50	\$9.50	\$12.00	\$3.50
Furnace coke, future...	7.00	7.00	7.00	3.00
Foundry coke, prompt...	10.50	11.00	13.00	3.75
Foundry coke, future...	7.50	7.50	8.00	3.50

### Metals,

Per Lb. to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Lake copper, New York...	36.00	36.00	36.00	27.12½
Electrolytic copper, N. Y.	36.00	36.00	36.00	26.87½
Spelter, St. Louis.....	10.37½	10.50	10.50	17.75
Spelter, New York.....	10.62½	10.75	10.75	18.00
Lead, St. Louis.....	9.37½	9.50	9.25	8.00
Lead, New York.....	9.50	9.50	9.50	8.00
Tin, New York.....	56.00	53.50	48.75	49.62½
Antimony (Asiatic), N. Y.	32.00	31.00	30.00	45.00
Tin plate, 100-lb. box, P'gh.	\$8.00	\$8.00	\$7.50	\$4.25

quoted on basic and foundry iron; ferroalloys are up fully \$5, with the supply steadily contracting; railroad spikes are up \$5; shafting about \$5 per ton, and an advance in nuts and bolts is looked for before the end of this week. Scrap prices are showing strong signs of going higher. The whole market is heading steadily toward higher levels, and the greatest difficulty of consumers will be to get material even at the high values. The car situation has cleared up a good deal, and a marked decline in prices of prompt coke has resulted.

**Pig Iron.**—While prices in the past week did not show the spectacular advances of the week before, yet Bessemer is up fully \$1 per ton. Basic has practically reached \$33, and all sellers of pig iron are quoting higher prices and apparently not anxious to sell, believing the market will be much higher. There have been some good-sized sales of Bessemer iron at \$37, and this price is regarded to-day as minimum. Fair-sized sales of basic iron have been made at \$33, with some sellers quoting as high as \$35, at furnace. There is a fairly active demand for foundry iron for the second half of the year, but the attitude of some producers in regard to selling for that delivery is shown by the fact that they are quoting as high as \$40 at furnace. As yet we do not know of actual sales of No. 2 foundry iron at that price, but there have been sales for second-half delivery at \$37 and \$38 per ton. The supply of iron available over the third quarter and last half of this year is very limited, and the demands on the steel works from the Government, in the event of war, make it sure, it is figured, that consumption of pig iron over remainder of this year will be enormously heavy, and that the limited supply may force up prices to levels never reached before. The Lukens Steel Company is understood to have an inquiry in this market for 20,000 to 30,000 tons of basic iron, none of which has yet been bought. There are other inquiries for 15,000 to 20,000 tons of Bessemer, and for probably 25,000 tons of basic. We now quote standard Bessemer iron at \$37 to \$38; basic, \$32 to \$33, with a probability that the higher price would have to be paid; malleable Bessemer, \$35 to \$36;

No. 2 foundry, \$37 to \$38, depending on delivery wanted, and gray forge, \$32 to \$33, the freight rate to the Pittsburgh and Cleveland districts being 95c. per ton.

**Billets and Sheet Bars.**—An open-hearth steel plant in the Youngstown district has been a steady buyer of shell discard steel for some time, and has recently bought 5000 to 6000 tons at \$41 to \$42 per ton, f.o.b. Pittsburgh. The same interest has been buying Bessemer and open-hearth ingots, and rolling them into sheet bars on its own blooming mill. Not much steel in the form of billets or sheet bars is being sold, as the supply is limited and consumers are pretty well covered for some months ahead. Deliveries of steel by the mills have been much better in the past two or three weeks, due to a larger supply of cars. It is claimed that close to \$70 per ton could readily be obtained for soft Bessemer or open-hearth billets or sheet bars, and a sale of 2000 tons of soft open-hearth bars is reported at about \$67, maker's mill. We do not change our quotations this week, but it might be very difficult to find any mill willing to sell billets or sheet bars at less than about \$70 at mill. We quote soft Bessemer and open-hearth billets and sheet bars at \$65 to \$70 per ton, maker's mill, Pittsburgh or Youngstown; forging billets, \$90 to \$95 for sizes up to but not including 10 x 10 in., and for carbons up to 0.25.

**Ferroalloys.**—A heavy advance in prices has marked nearly all grades of ferroalloys, due to scarcity in supply. Prices are up \$5 per ton or more. The minimum of domestic 80 per cent ferromanganese is \$300 to \$325 per ton at furnace, but it is very difficult to obtain even at these prices. The local maker recently quoted \$350 per ton on the 80 per cent alloy, and would not shade that price. Several importers are still quoting \$185 seaboard for English ferromanganese for last-half delivery, but it is practically certain that very little of this material will be received over the rest of this year. We now quote domestic 80 per cent ferromanganese for prompt shipment at \$300 to \$350 per ton, and one or two sellers are refusing to quote. We have advanced prices on spiegeleisen, and now quote

18 to 22 per cent at \$70 to \$75, and 25 to 30 per cent at \$80 to \$85, delivered. We quote 9 per cent Bessemer ferrosilicon at \$51 to \$52; 10 per cent, \$53; 11 per cent, \$55; 12 per cent, \$60; 13 per cent, \$62; 14 per cent, \$65; 15 per cent, \$68; and 16 per cent, \$70. The above show advances from \$5 to as much as \$12 to \$15 per ton. We quote 7 per cent silvery iron at \$45 to \$46; 8 per cent, \$46 to \$47; 9 per cent, \$48 to \$49; 10 per cent, \$49 to \$50; and 11 and 12 per cent, \$51 to \$52, all f.o.b. at furnace, Jackson or New Straitsville, Ohio, and Ashland, Ky., these furnaces having uniform freight rates of \$2 per gross ton for delivery in the Pittsburgh district.

**Structural Material.**—New inquiry in the past week was active. The Massillon Bridge Works has taken 2500 tons for a warehouse for the New York Central Railroad at Cleveland, and this road has an inquiry out for 1000 tons of steel shapes for grade crossings. The American Bridge Company has taken 350 tons of bridge work for the Pennsylvania Railroad, 200 tons for the Chesapeake & Ohio, and 1000 tons for an office building in the East. The Fort Pitt Bridge Works has taken 650 tons of bridge work for the Baltimore & Ohio and 200 tons for the Lackawanna. Several large jobs were placed just prior to the recent advance of \$7 in shapes, but the fabricators are not ready to give out details. We quote beams and channels up to 15 in. at 3.60c. to 3.75c. for extended delivery, while small lots from warehouse are quoted at 4.25c. to 5c., depending on quantity.

**Plates.**—Some fair-sized orders for cars were placed in the past week, and the demand for plates from car-builders and shipbuilding plants continues enormously heavy. Most of the mills are practically filled for this year, and some have taken large contracts for delivery in first half of 1918. The Union Tank Line equally divided 2000 steel tank cars between the Standard Steel Car Company and the American Car & Foundry Company. The Southern Railroad has placed 2000 freight cars with the Pressed Steel Car Company, and the Cambria Steel Company has taken 1000 steel hoppers for the Mariana Company. The Florida East Coast Line has bought 200 flat and 100 wooden box cars, and the Havana Central is in the market for 600 flat and 300 box cars. Ship plates continue to be quoted at 6c. to 7c., while  $\frac{1}{4}$ -in. and heavier sheared plates are 4.50c. minimum, this being the price of the Carnegie Steel Company, with no definite promise of delivery. Other makers are quoting 4.75c. to 5.25c. for four to six months' delivery. On small lots for fairly prompt shipments, prices are 5.50c. to 6c., and even higher.

**Steel Rails.**—The Carnegie Steel Company has advanced prices on angle bars for standard section rails from 2.75c. to 3.25c. or \$10 per ton. Only small current orders are being placed for standard sections, but the new demand for light rails is active, the coal interests being steady buyers and in fairly large lots. We quote light rails as follows: 25 to 45 lb., \$55; 16 to 20 lb., \$56; 12 and 14 lb., \$57; 8 and 10 lb., \$58; in carload lots, f.o.b. mill, with the usual extras for less than carloads. Standard section rails of Bessemer stock are held at \$38, and open-hearth \$40, per gross ton, Pittsburgh.

**Sheets.**—As yet none of the sheet mills is quoting for delivery beyond July 1, and they report having the greater part of their output under contract over the second quarter. Some mills that are able to make quite prompt deliveries on sheets have sold No. 28 Bessemer black as high as 5.50c. and 5.75c. at mill. There is a heavy export demand, but local mills, as a rule, are not quoting, needing their entire output for domestic consumers. Prices are likely to be higher in the near future. We quote blue annealed sheets, Nos. 3 to 8, at 5c. to 5.25c.; box annealed, one pass Bessemer cold-rolled, No. 28, 5c. to 5.50c.; No. 28 galvanized, 6.75c. to 7.50c.; No. 28 black plate, tin-mill sizes, 4.75c. to 5c., all f.o.b. mill, Pittsburgh. These prices are for carloads and larger lots for shipment over the next three or four months. Mills that can ship out in four to six weeks readily get premiums over these prices.

**Tin Plate.**—The new demand is strong, and practically all the output of the leading makers is under

contract through the third quarter, and some over the entire year. It is not known when the price for second-half delivery will be announced, but it is likely to be higher than many in the trade expect. There is a heavy export demand, and several local makers say they could readily get as high as \$8 per base box if they had any to spare and take care of their customers at the same time. On current orders, prices for primes and wasters range from \$7.50 to \$8 per base box. We quote long-terne plate, No. 28 gage base, at \$7 to \$7.50; short-terne plate, \$11.50 to \$12.50, maker's mill, prices depending on quantity and deliveries wanted.

**Shafting.**—Makers report that the 20 per cent discount has not only disappeared, but that even 15 per cent off list is being quoted only on the most desirable orders and to regular customers. One company, from March 15, has been quoting 5 per cent off list, f.o.b. cars, Pittsburgh, for second quarter and will not shade this price. The recent advance of \$7 per ton in prices on steel bars is the cause of the heavy advance in shafting. We now quote cold-rolled shafting from 5 to 10 per cent off list, but to a few large customers some makers might quote 15 per cent off. The list price on shafting is 5c. per lb., and with a 10 per cent discount the net price is 4.50c., so that the spread between steel bars and finished shafting is not out of line.

**Railroad Spikes and Track Bolts.**—As predicted in this report last week, prices on railroad spikes have been advanced \$5 per ton, or from \$3.40 to \$3.65 base, f.o.b. at mill. Track bolts have also been advanced, due to the heavy demand and the higher prices of steel. We now quote track bolts with square nuts at 5c. to 5.10c. to railroads, and 5.25c. to 5.35c. in small lots to jobbers, base. Railroad spikes, 9/16-in. and larger, are now \$3.65 base; 7/16 and  $\frac{1}{2}$ -in., \$3.75 base; 5/16 and  $\frac{3}{8}$ -in., \$4 base. Boat spikes are \$3.90 base, all per 100 lb., f.o.b. Pittsburgh.

**Wire Products.**—The recent advance is not only holding but actual sales have been made of both nails and wire at \$2 to \$3 per ton over the prices thus named. The demand for wire nails and wire is abnormally heavy, the mills are filled up for three to four months and specifications are reported active. Export demand is also strong, but local makers say they are not quoting as they cannot get out enough nails and wire to meet the demand of the domestic trade. We quote: Wire nails, \$3.20 base per keg; galvanized, 1 in. and longer, including large-head barb roofing nails, taking an advance over this price of \$2.20, and shorter than 1 in. \$2.70. Bright basic wire is \$3.25 per 100 lb.; annealed fence wire, Nos. 6 to 9, \$3.15; galvanized wire, \$3.85; galvanized barb wire and fence staples, \$4.05; painted barb wire, \$3.35; polished fence staples, \$3.35; cement-coated nails, \$3.10, base, these prices being subject to the usual advances for the smaller trade, all f.o.b. Pittsburgh, freight added to point of delivery, terms 60 days net, less 2 per cent off for cash in 10 days. Discounts on woven-wire fencing are 51 per cent off list for carload lots, 50 per cent off for 1000-rod lots, and 49 per cent off for small lots, f.o.b. Pittsburgh.

**Wire Rods.**—The supply of rods is inadequate to meet the demand, and mills that can promise shipments in two or three months can get practically any price they ask. Several sales of soft Bessemer and open-hearth rods were made recently at \$80, maker's mill, but the sellers of these rods are now quoting \$85, and say they will not shade that price. It is stated that 1000 tons of soft Bessemer rods was sold recently at above \$80, maker's mill, for export to Canada. There is a heavy demand from Canada, South America and Japan.

**Iron and Steel Bars.**—The minimum price that any maker is quoting on steel bars is 3.35c. at mill, and several makers that can ship in 8 to 10 weeks from date of order are quoting as high as 3.50c. Most of the large producers of steel bars have their output pretty well sold for all of this year, but there are others that have not sold so far ahead and can make deliveries in May and June. Practically all the large implement

makers are covered over the remainder of this year, and mills report specifications against contracts coming in quite freely. The demand for reinforcing steel bars has been restricted to some extent by the very high cost of labor and materials used in building operations. We quote steel bars at 3.35c. at mill, with no promise of definite delivery, and 3.50c. to 3.75c. for shipment in two to three months. We quote refined iron bars at 3.50c. and railroad test bars 3.65c. at mill in carload lots.

**Cold-Rolled Strip Steel.**—Practically all large consumers have covered their needs up to July 1. Mills report specifications active. So far none of the makers has opened books on contracts for second-half delivery. The current demand for small lots is moderately active. For second-quarter delivery we quote cold-rolled strip steel at \$7 to \$7.25 per 100 lb. on current orders. For reasonably prompt shipment mills are getting \$7.25 to \$7.50 and higher. Terms are 30 days net, less 2 per cent for cash in 10 days, delivered in quantities of 300 lb. or more when specified for at one time.

**Nuts and Bolts.**—The expected advance in prices of nuts and bolts has not been made, but will probably take place this week. Makers say that on account of the higher prices for steel bars, an advance in nuts and bolts is imperative. The new demand in the past week or two has not been so active, as consumers are pretty well filled up to July 1, and some over the entire year. The export demand is still active, but most makers are sold so far ahead that, with the restricted output, due to shortage in steel bars and labor, they need their entire output for domestic customers. A shipment of two carloads of nuts and bolts was recently made by a local maker to Japan. Discounts in effect at this writing are as follows, delivered in lots of 300 lb. or more, when the actual freight rate does not exceed 20c. per 100 lb., terms 30 days net, or 1 per cent for cash in 10 days:

Carriage bolts, small, rolled thread, 40 and 10 per cent; small, cut thread, 40 and 2½ per cent; large, 30 and 5 per cent.

Machine bolts, h. p. nuts, small, rolled thread, 50 per cent; small, cut thread, 40 and 10 per cent; large, 35 and 5 per cent.

Machine bolts, c. p. c. and t. nuts, small, 40 per cent; large, 30 per cent. Bolt ends, h. p. nuts, 35 and 5 per cent; with c. p. nuts, 30 per cent. Lag screws (cone or gimlet point), 50 per cent.

Nuts h. p. sq. and hex., blank, \$2.50 off list, and tapped, \$2.30 off; nuts, c. p. c. and t. sq., blank, \$2.10 off, and tapped, \$1.90 off; hex., blank, \$2.25 off, and tapped \$2 off. Semi-finished hex. nuts, 50, 10 and 5 per cent. Finished and case-hardened nuts, 50, 10 and 5 per cent.

Rivets 7/16 in. in diameter and smaller, 40 and 10 per cent.

**Rivets.**—The advance of \$10 per ton in prices on rivets is holding firm, and makers say they are already entering some small orders at the higher price, but the large trade is well covered up to July 1, and some consumers beyond that date. The export demand is active, and makers have no trouble in getting export business when they can obtain vessels. Makers quote buttonhead structural rivets, ½-in. in diameter and larger, \$4.75 per 100 lb., base, and conehead boiler rivets, same sizes, \$4.85 per 100 lb., base, f.o.b. Pittsburgh. Terms are 30 days net, or ½ of 1 per cent off for cash in 10 days.

**Hoops and Bands.**—The minimum price now ruling on steel bands is 3.35c., which is quoted by the Carnegie Steel Company, with no definite promise of delivery. Other makers that are not sold so far ahead, are quoting as high as 3.50c. for shipment late in second and over the third quarter. Prices on steel hoops range from 3.75c. minimum, with no promise of delivery, up to 4c. and 4.25c. at mill.

**Wrought Pipe.**—None of the mills can take new orders for lap-weld iron or steel pipe, or for line pipe, for delivery before October, and two of the largest mills report they are practically out of the market as sellers for delivery at any time this year. There is an insistent demand for line pipe from gas and oil companies, but very little new business is being placed, as the mills cannot make the deliveries wanted. On butt weld sizes of iron and steel pipe, mills are getting booked to a larger extent, and some are not promising deliveries now before 10 to 12 weeks from date of order.

The new demand for oil country goods is heavy, due to the development of several new fields, which heretofore have not been operated, but on which some large producing oil wells have been struck. Discounts on black and galvanized iron and steel pipe are given on another page.

**Boiler Tubes.**—Few of the makers of iron and steel tubes are quoting for delivery this year, and heavy premiums over regular prices are readily paid by consumers where they can get mills to accept their orders. On seamless steel tubing, the situation as regards deliveries is worse, the two local makers stating they are not only filled for all of this year, but also for first half of 1918. The nominal discounts on iron and steel tubes are given on another page.

**Old Material.**—The new demand has been a little better in the past week, and dealers believe that the market will soon show further improvement, not only in demand, but in prices as well. Several open-hearth steel plants outside the Pittsburgh district have bought large lots of melting scrap, and there is also an active demand for turnings, which are used in blast furnaces, the output of pig iron being larger if there are turnings in the charge. There is also a heavy demand from the foundries for No. 1 cast scrap, partly due to the shortage in supply of foundry iron. Higher prices are being paid for melting scrap in the Youngstown and Sharon districts than locally. One large consumer in the Youngstown district is taking in large lots of heavy steel scrap at \$22 to \$23, delivered. There is also demand for low-phosphorus melting stock, and prices are firm. An advance in prices on some grades of scrap, that are regarded now as selling too low, is looked for in the very near future. Prices for delivery in Pittsburgh and at other consuming points that take Pittsburgh freight rates, per gross ton, are as follows:

Heavy steel melting scrap, Steubenville, Follansbee, Brackenridge, Sharon, Monessen, Midland and Pittsburgh, delivered	\$22.00 to \$23.00
No. 1 foundry cast	20.00 to 20.50
Rerolling rails, Newark and Cambridge, Ohio, Cumberland, Md., and Franklin, Pa.	27.00 to 28.00
Hydraulic compressed sheet scrap	18.00 to 18.50
Bundled sheet scrap, sides and ends, f.o.b. consumers' mills, Pittsburgh district	15.50 to 16.00
Bundled sheet stamping scrap	15.00 to 15.50
No. 1 railroad malleable stock	19.00 to 19.50
Railroad grate bars	12.50 to 13.00
Low-phosphorus melting stock	32.00 to 32.50
Iron car axles	41.00 to 42.00
Steel car axles	45.00 to 46.00
Locomotive axles, steel	48.00 to 49.00
No. 1 busheling scrap	18.50 to 19.00
Machine-shop turnings	11.50 to 11.75
Old carwheels	20.50 to 21.00
Cast-iron borings	11.75 to 12.00
*Sheet bar crop ends	25.00 to 26.00
No. 1 railroad wrought scrap	24.50 to 25.00
Heavy steel axle turnings	15.50 to 16.00
Heavy breakable cast scrap	19.00 to 19.50

\*Shipping point.

**Coke.**—The supply of cars last week was the best in a long time, and as a result prices on prompt furnace coke showed a material decline. Early this week high-grade furnace coke was offered as low as \$8.50 per net ton at oven, and possibly \$8 could have been done on firm offers. However, with the better supply of cars, deliveries on contract coke were fairly good, and this cut off, to some extent, the demand for prompt coke. If the present good weather lasts much lower prices on prompt furnace and foundry coke are likely. We now quote best grades of furnace coke at \$8.50 to \$9 per net ton at oven, and prompt 72-hr. foundry coke at \$10.50 to \$11 per net ton at oven. Nothing is being done in contracts for furnace coke, as consumers will not pay the high prices asked by the producers. The Connellsville, Pa., *Courier* gives the output of coke in the upper and lower Connellsville regions for the week ending March 10 as 349,204 tons, an increase over the previous week of 2741 tons.

The Master Machine Works, 110 West Fortieth Street, New York City, builder of lathes, has changed its name to the Master Machine Tool Company. No changes have been made in the management of the company, M. D. Kopple continuing as president.

## Chicago

CHICAGO, ILL., March 20, 1917.

Whatever the effect anticipated by the exceptional advance of prices a week ago, the attitude of the buyers of rolled steel products is still one of eagerly seeking materials. In some lines a disposition to liquidate stocks of raw material already on hand or purchased has appeared, the feeling being that prices are now so high that the safe policy lies in allowing the future to take care of itself. More generally, buyers still show an eagerness in covering for their first-half requirements. The demand for plates continues an outstanding feature of the market, and one large interest which has been catering to prompt delivery requirements at premium prices, having received inquiry on some 75,000 tons last week, has temporarily withdrawn all quotations. The mills which have been quoting on plates, shapes, bars and sheets, deliveries within three months, have moved up the premium they have been asking for these deliveries, following the advance made in contract prices. For shapes, 4c., Pittsburgh, is being quoted; for plates, 5.50c., and for bars, 3.75c. Railroad activity was limited last week, both as regards the buying of track equipment and rolling stock, the principal business coming from one of the roads in the Northwest involving tie-plates, spikes and bolts. The users of mild steel bars are now very generally provided for as regards their needs through the first half of 1918, but the demand for reinforcing bars, which will more largely be met with rail carbon steel and bar iron than ever before, is making its appearance as a preparation for the spring building season. Bar iron is selling into an increasingly wide market as steel bars become more difficult to secure. The volume of sales reported by jobbers shows no shrinkage, following the further advancing of prices. Difficulty is experienced in making freight movements out of stock as rapidly as custom demands. Inquiry for pig iron, though of moderate proportions as to tonnage, acquires size in view of the restricted supply now available. Ordinary requirements of the melter become imperative with uncertain deliveries and possible shortages threatening. Negotiations of the week include lots of 6000 tons, 4000 tons, and many others of 1000 tons and less, with the demand for malleable iron especially insistent. The scrap market has moved upward rapidly in the week, the difficulty of securing old material from the railroads and other usual sources being more responsible for the higher quotations than any increase in buying.

**Pig Iron.**—Considering the supply of pig iron available in this market from all districts, each week brings a further limitation in the number of sources from which material may be had. In the last week further withdrawals from the market by leading Southern producers were announced. In one instance this seems likely to be only temporary and to be followed by an advance in the prices previously quoted. Except for a very few transactions having to do with resale iron, the Southern market appears to be firmly established at \$30, Birmingham, while \$30.25 has been done and \$31 is reported. The local furnaces have put their prices up to \$37 at the furnace for foundry, basic and malleable irons, though one interest at Milwaukee at least is quoting foundry iron at \$1 per ton under malleable Bessemer. This spread is indicative of the particular difficulty of securing the latter iron, as well as its non-competitive status. The very limited quantity of iron available for sale enlarges the proportions of any inquiry, and the aggregate of iron under consideration finds comparatively few furnaces in a position to deliver. For this reason business is closed very rapidly. An inquiry for 6000 tons of Southern iron, and another of 4000 tons of Northern iron from the Steam Pump company subsidiary at Cudahy, Wis., are the largest under consideration. Other inquiries and sales involving lots of 2000 tons and less are numerous, the iron being almost entirely for last-half shipment. Sales of charcoal iron thus far in the current month have been heavy, one interest alone disposing of 10,000 tons, which leaves it with little more than two months' production to sell for delivery during the remainder of the

year. Spot 80 per cent ferromanganese is scarce, with local sellers not being willing to consider less than \$300 delivered. For Lake Superior charcoal iron we quote delivery prices at Chicago to include a freight rate of \$1.75. The following quotations are for iron delivered at consumers' yards, except those for Northern foundry, malleable Bessemer and basic irons, which are f.o.b. furnace, and do not include a switching charge averaging 50c. per ton.

Lake Superior charcoal, Nos. 2 to 5.....	\$36.75 to \$38.75
Lake Superior charcoal, No. 1.....	37.25 to 39.25
Lake Superior charcoal, No. 6 and Scotch .....	37.75 to 40.25
Northern coke foundry, No. 1.....	37.50
Northern coke foundry, No. 2.....	37.00
Northern coke foundry, No. 3.....	36.50
Northern high-phosphorus foundry.....	36.00 to 37.00
Southern coke No. 1 f'dry and 1 soft.....	35.00 to 35.50
Southern coke No. 2 f'dry and 2 soft.....	34.00 to 35.00
Malleable Bessemer .....	37.00
Basic .....	37.00
Low phosphorus .....	62.50
Silvery, 8 per cent.....	42.50 to 46.50
Bessemer ferrosilicon, 10 per cent.....	50.00

**Rails and Track Supplies.**—One of the Hill lines, following its tentative inquiry for tie-plates, spikes and bolts, promptly closed for 10,000 tons of tie-plates, 20,000 kegs of spikes, and 12,000 kegs of bolts. While the price of tie-plates participated in the advances of a week ago, it is not certain that all quotations on the basis of \$55 were withdrawn, and competition is reported to have disclosed prices even lower than that. Further accommodation of the railroads by local mills appears to be limited to deliveries in the third quarter of 1918 or later. Rails sales of the last week were of no importance in respect to tonnage. Quotations are as follows: Standard railroad spikes, 3.60c. to 3.70c., base; track bolts with square nuts, 4.60c. to 4.70c., base, all in carloads, Chicago; tie-plates, \$60, f.o.b. mill, net ton; standard section Bessemer rails, Chicago, \$38, base; open-hearth, \$40; light rails, 25 to 45 lb., \$52; 16 to 20 lb., \$53; 12 lb., \$54; 8 lb., \$55; angle bars, 2.25c.

**Structural Material.**—The buying of structural steel for large building projects had been so far curtailed because of high prices preceding the last advance that little further restriction has been noted or is possible. Contracts for fabricated work placed last week were few in number, and included 1350 tons for a bank building at Dallas, Texas, taken by the Mosher Mfg. Company, and 800 tons for a Leland Stanford, Jr., University building, placed with the Vulcan Iron Works. No new awards of cars are reported, and inquiry not previously reported is limited to 200 hoppers for the Milwaukee Electric Light & Railway Company, 200 hoppers for the National Dump Car Company, and 50 refrigerator cars for the Chicago, Milwaukee & St. Paul. Mill deliveries of structural steel are of interest only in connection with the quotations of the few mills that have been taking early delivery business, and the best that they are now able to offer is shipment in the third quarter, and that almost entirely of Bessemer steel. For this delivery, 4c., Pittsburgh, is being asked. We quote for Chicago delivery of plain delivery from mill 3.789c., delivery at mill's convenience.

We quote for Chicago delivery of structural steel out of jobbers' stocks 4.25c.

**Plates.**—The important mill in the Pittsburgh district which has been a factor in the taking of orders for ship plates for the Orient, and for tank plates for early delivery, has temporarily withdrawn from the market, being unable to accommodate the flood of inquiry. Quotations were asked last week alone, it is reported, upon an aggregate exceeding 75,000 tons. For shipment in the second and third quarters a price of 5.50c., Pittsburgh, was asked. For tank plates in widths exceeding 84 in., 6c. and higher is a usual quotation for nearby delivery, and narrower plates making up a part of the same orders have been taken at equal prices. But the few mills rolling the narrower widths of plates are still in a position to quote and have been taking business at prices \$10 to \$15 per ton lower. The consideration of new contracts by the leading interest is limited to the first half of 1918, and specifications against these are required to be complete in the last half. We quote for Chicago delivery of plates from mill, at its convenience,

4.689c.; for prompt shipment, in widths up to 72 in., 5.189c. to 5.689c.; and for wide plates, 5.689c. to 6.19c., depending upon deliveries.

We quote for Chicago delivery of plates out of jobbers' stocks, 5.50c.

**Sheets.**—Minimum quotations on sheets are gradually working upward, and for blue annealed less than 5c. Pittsburgh can hardly be done, while for black sheets the most favorable quotation appears to be 5.25c. The local independent mill is still out of the market, while the leading interest can offer only remote deliveries. The most favorable prices for blue annealed sheets are to be had on the lighter gages which can be rolled on the sheet mills. We quote for Chicago delivery, No. 10 blue annealed, 5c.; box annealed, No. 16 and lighter, 5.25c.; No. 28 galvanized, 6.75c. to 7.50c. These quotations are minimum prices for contracts. Early shipment quotations are \$5 to \$10 per ton higher.

We quote for Chicago delivery out of stock, regardless of quantity, as follows: No. 10 blue annealed, 5.50c.; No. 28 black, 5.65c.; No. 28 galvanized, 7.75c.

**Bars.**—Mills rolling high-carbon steel bars report the beginning of demand for reinforcing purposes, and quotations are now fairly well established on the basis of 3.25c., mill. The price of bar iron remains at 3c. to 3.10c. The greater strength of the market, which has followed a steady increase in inquiry, shows itself in the disappearance of the occasional concession from the 3c. basis. While there remain a few mills in a position to offer fair deliveries of mild steel bars, the important users, both in the implement and general manufacturing trades, are now well covered through the first half of next year. We quote mill shipment, Chicago, as follows: Bar iron, 3c. to 3.25c.; soft steel bars, 3.539c. to 3.689c.; hard steel bars, 3.25c.; shafting, in carloads, 20 per cent off, less than carloads, 15 per cent off.

We quote prices out of store for Chicago delivery as follows: Soft steel bars, 4c.; bar iron, 4c.; reinforcing bars, 4c. base, with 5c. extra for twisting in sizes  $\frac{1}{2}$  in. and over and usual card extras for smaller sizes; shafting list plus 5 per cent.

**Rivets and Bolts.**—The expected revision of bolt and nut discounts has not yet materialized. Some interest is being displayed in the placing of last half contracts, and specifications against existing contracts are undiminished in volume. The higher price for rivets has not yet been established in any general way by sales, but is commonly quoted. We quote as follows: Carriage bolts up to  $\frac{3}{8}$  x 6 in., rolled thread, 40-10; cut thread, 40-2 $\frac{1}{2}$ ; larger sizes, 30-5; machine bolts up to  $\frac{3}{8}$  x 4 in., rolled thread, with hot pressed square nuts, 50; cut thread, 40-10; large size, 35-5; gimlet-point coach screws, 50; hot pressed nuts, square, \$2.50 off per 100 lb.; hexagon, \$2.60 off. Structural rivets,  $\frac{3}{4}$  to 1 $\frac{1}{4}$  in., 4.75c. to 4.939c., base, Chicago, in carload lots; boiler rivets, 10c. additional.

Store prices are as follows: Structural rivets, 4.75c.; boiler rivets, 4.85c.; machine bolts up to  $\frac{3}{8}$  x 4 in., 40-10; larger sizes, 35-5; carriage bolts up to  $\frac{3}{8}$  x 6 in., 40-2 $\frac{1}{2}$ ; larger sizes, 30-5; hot pressed nuts, square, \$3, and hexagon, \$2 off per 100 lb.; lag screws, 50.

**Cast-Iron Pipe.**—An advance of \$3 per ton is announced this week, making the quotation for 4-in. pipe \$48.50, Chicago. The high level of prices continues to deter municipalities from placing business, and lettings in prospect are few. At Scott's Bluff, Neb., 325 tons is to be purchased. The Lynchburg Foundry Company is understood to have taken the 300 tons at Great Falls, Mont. Inquiry for 1000 tons of gas pipe for southern Michigan is noted, and several smaller inquiries from the railroads for water pipe are in hand for quotation. We quote as follows, per net ton, Chicago: Water pipe, 4-in., \$48.50; 6-in. and larger, \$43.50, with \$1 extra for class A water pipe and gas pipe.

**Wire Products.**—The demand for wire which ordinarily reaches its maximum at this season of the year is showing relatively smaller gains as the result of the now well-recognized conditions in that trade. The jobbers and dealers are pressing for the materials, needed to replenish their stocks, but the mills are making little headway in improving their deliveries. We quote to jobbers as follows, per 100 lb.: Plain wire, Nos. 6 to 9, base, \$3.439; wire nails, \$3.389; painted barb wire,

\$3.539; galvanized barb wire, \$4.239; polished staples, \$3.539; galvanized staples, \$4.239, all Chicago.

**Old Material.**—Larger consumers of scrap, who have been especially affected by the delays in delivery of materials long since ordered, report some easing up of the congestion. That fact has not yet reacted on the market and the tendency of prices continues strongly upward. Advances of \$1 to \$1.50 were recorded in sales of a number of the commonly used grades, while scrap specialties which had been inactive for some time were sharply adjusted to the higher scale of prices now ruling. A disparity in carwheel quotations has given way to a uniformly higher market. Iron and steel axles are again in active demand at fancy prices, while for locomotive tires quotations extend over a wide range, depending upon the urgency of buyers' needs. Rerolling rails have again moved up and are quotable at about \$30, delivered. The railroads are still without facilities for picking up scrap, and their offerings are very light, the lists of the week including only two of any importance, one from the Michigan Central, covering 1200 tons, and one from the Zoo Line, of 500 tons. We quote for delivery at buyers' works, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton	
Old iron rails	\$28.00 to \$29.00
Relaying rails	34.00 to 35.00
Old carwheels	21.00 to 21.50
Old steel rails, rerolling	29.00 to 30.00
Old steel rails, less than 3 ft.	26.50 to 27.00
Heavy melting steel scrap	24.50 to 25.00
Frogs, switches and guards, cut apart	24.50 to 25.00
Shoveling steel	20.50 to 21.00
Steel axle turnings	15.50 to 16.00

Per Net Ton	
Iron angles and splice bars	\$29.00 to \$29.50
Iron arch bars and transoms	29.50 to 30.00
Steel angle bars	25.50 to 26.00
Iron car axles	37.00 to 38.00
Steel car axles	38.00 to 39.00
No. 1 railroad wrought	27.00 to 27.50
No. 2 railroad wrought	25.50 to 26.00
Cut forge	25.50 to 26.00
Pipes and flues	15.00 to 15.50
No. 1 busheling	17.75 to 18.25
No. 2 busheling	13.50 to 14.00
Steel knuckles and couplers	24.50 to 25.00
Steel springs	25.50 to 26.00
No. 1 boilers, cut to sheets and rings	15.50 to 16.00
Boiler punchings	20.00 to 20.50
Locomotive tires, smooth	36.00 to 36.50
Machine-shop turnings	9.50 to 10.00
Cast borings	9.50 to 10.00
No. 1 cast scrap	17.25 to 17.75
Stove plate and light cast scrap	12.50 to 13.00
Grate bars	13.50 to 14.00
Brake shoes	13.00 to 13.50
Railroad malleable	18.00 to 18.50
Agricultural malleable	16.00 to 16.50

## Philadelphia

PHILADELPHIA, PA., March 20, 1917.

Events of great importance in the United States and Europe are having marked effect on the iron and steel markets in this district. The announcement that there would be no general railroad strike was received with rejoicing, as it was recognized that at a time when railroad congestion is extremely serious, a general stoppage of movement of cars for even a day would have been disastrous. The torpedoing of three American vessels by German submarines, making war almost certain, has caused the adoption of a more conservative selling policy by leading manufacturers of finished materials, who believe that this policy is demanded alike by patriotism and sound business judgment. It is expected that some of the manufacturers will be called upon to furnish large tonnages of materials for the Government and one large independent company which has already served the Government extensively took almost no business the past week, as it is preparing to meet any demand that may result from international complications. Another company reports that almost any day's mail represents a tonnage large enough to keep its mills in operation 30 days, but it is booking very little new business. Activity in pig iron continues and further sharp advances have taken place in foundry grades. Active demand for plates is still a leading feature. Old material is active and strong.

**Pig Iron.**—Following the purchase of 40,000 tons of basic by the Lukens Steel Company, Coatesville, Pa., as reported last week at an average price of \$33.80

delivered, the same company purchased 18,500 tons, making its total 58,500 tons. It is understood that the average price of the whole tonnage was the same as for the first 40,000 tons. Of the 18,500 tons, a large percentage came from eastern Pennsylvania furnaces at \$35 delivered, but some of the iron came from a Pittsburgh steel company which, on account of fuel shortage, has been unable to keep its finishing mills and steel plant in full operation, and has been selling some of the product of its blast furnaces. The Pittsburgh iron was sold at a somewhat lower delivered price than the eastern Pennsylvania product. A Cumberland, Md., buyer obtained 4500 tons of basic at \$33, Valley, or \$34.74 delivered. It is understood that the Pittsburgh steel company referred to has no more iron for sale, and higher quotations on basic are expected. The foundry-iron market has advanced rapidly and about 2000 tons of No. 2 X have been sold at \$40 delivered, Philadelphia. A small tonnage of No. 3 was also sold at \$40. At present \$39 seems to be the minimum for No. 2 X. Virginia iron has also advanced rapidly. A leading producer which opened its books recently for delivery during the first half of 1918 and sold about 25,000 tons at \$31 furnace, or \$33.75 Philadelphia, advanced to \$32 furnace, last week, and made additional sales of perhaps 10,000 tons, has now advanced to \$33 for the same delivery. For this year's delivery, \$38.75 delivered is the prevailing quotation. There is a very limited demand for gray forge and quotations are regarded as nominal. In Alabama iron, \$30, Birmingham, now seems to be the minimum, but no sales of importance are reported. Standard low phosphorus is very scarce. The market is quoted at from \$65 to \$70 delivered. In their eagerness to obtain this iron, some buyers have paid more for copper-bearing product than for the standard, although the reverse is usually true. The rule of the market on all iron now is that whenever a sale is made quotations are promptly advanced. Quotations for standard brands delivered in buyers' yards, prompt shipment, range about as follows:

Eastern Pa. No. 2 X foundry.....	\$39.00 to \$40.00
Eastern Pa. No. 2 plain.....	38.50 to 39.00
Virginia No. 2 X foundry.....	38.25 to 38.75
Virginia No. 2 plain.....	38.25 to 38.75
Gray forge .....	33.25 to 33.75
Basic .....	35.00 to 35.50
Standard low phosphorus.....	65.00 to 70.00

**Iron Ore.**—The scarcity of low-phosphorus ore suitable for the manufacture of low-phosphorus pig iron is pronounced. These deposits are closely held and no ore of this grade is being offered for sale. Arrivals of iron ore in the Philadelphia port for the week ended March 17 consisted of 3000 tons from Spain, valued at \$10,000, and 5800 tons from Cuba, valued at \$29,580.

**Ferroalloys.**—Owing to the difficulty of obtaining vessels to deliver English ferromanganese, the domestic product is being given a decided preference. The recent quotation of \$185, seaboard, for English 80 per cent is nominal. Spot domestic is quoted at \$300 delivered; third quarter, \$275 to \$300, and fourth at \$250 to \$275.

**Plates.**—The demand for plates, whose description has worn out such adjectives as tremendous and unprecedented, is now referred to as "terrific." As proof that strong language is necessary to describe the situation, it may be said that one company which last week had inquiries for 80,000 tons agreed to sell not over 5000 tons, and it may also be noted that one lot of several hundred tons of ship steel for delivery the last quarter of this year was placed at a premium of \$20 per ton over the present high price. The sale is, of course, unusual, and no general advance in quotations has been announced. A buyer who desired to place 12,000 tons for four ships for delivery in the third quarter of 1918 was not able to obtain a quotation. A Pacific coast shipyard which was so fortunate as to be able to place 4000 tons of boat plates at the present price at once inquired for 5000 tons additional for shipment in the first half of next year, but the mill declined to take that tonnage at any price. It is understood that the Cunard Line has thus far ordered 18 ships in this country and would like to buy 12 more, but it would have difficulty in contracting for the vessels. Inquiries for car plates continue to come in. A new one calls

for 4000 tons for shipment in the first quarter of next year. Quotations by leading independent companies are 6.159c., Philadelphia, for tank plates; 7.659c. for ship plates, 9.159c. for Lloyd's boiler steel, and 15.559c. for marine boiler steel.

**Structural Material.**—Quotations on structural shapes are firmer and are advancing. Following the advance of the Steel Corporation to 3.60c., Pittsburgh, one eastern Pennsylvania structural mill, as announced last week, advanced its quotation to 3.75c., Pittsburgh, but cannot give delivery in less than eight months. It is probable that this company will soon advance to 4c. Another company which had been selling at 3.50c., Pittsburgh, has advanced to 3.75c. for delivery in three to four months. Although little definite information as to the plans of the Government is obtainable, it is known that large additional tonnages will be required by the navy, and it is expected that the steel needed for new construction at the Norfolk Navy Yard will be considerably in excess of the tonnage initially announced. It is also understood that the Government expects to erect a larger number of hangars than has been announced. Two interesting features of the structural steel market are the unusual demand for angles for use in truss work and the efforts that are being made by the contractors to obtain tonnages from Eastern mills after having failed to secure deliveries in the Pittsburgh district. The contract for the Commercial National Bank Building, Washington, calling for 700 tons, has been awarded to the American Bridge Company.

**Billets.**—Demand continues strong, but the supply is limited. Rerolling billets are quoted at \$65 to \$70, and forging billets from \$90 to \$100. When shell discard amounts to 40 per cent, and 15 per cent of that discard is cut off, the remaining 25 per cent is being sold at \$60 per ton, and the demand is active.

**Bars.**—Owing to the advance of the Steel Corporation to 3.35c., Pittsburgh, on steel bars, the general tendency of the independent manufacturers is to ask somewhat higher prices than they had been naming, and 3.75c., Pittsburgh, or 3.909c., Philadelphia, is not an unusual quotation. Iron bars are quoted at 3.659c., Philadelphia, for carload lots. The Bridgeport Projectile Company, Bridgeport, Conn., is in the market for 7300 tons of rounds for the Government. The Delaware & Hudson Railroad is inquiring for 2500 kegs of spikes for the last half of this year.

**Sheets.**—Demand for blue annealed sheets is strong, and the minimum quotation on No. 10 is now 5c., Pittsburgh, or 5.159c., Philadelphia. Orders are being taken in a very conservative way.

**Coke.**—The temporary embargo on coke shipments resulted in an unusually large tonnage accumulating in the Connellsville and other regions, and prices for that reason, and also because of some improvement in car supply are easier. Spot furnace has declined about 50c., and can now be purchased at \$9.50 per net ton at oven. Foundry coke is selling at \$11 at oven under contract. Freight rates from the principal producing districts are as follows: Connellsville, \$2.05; Latrobe, \$1.85, and Mountain, \$1.65.

**Old Material.**—The Lukens Steel Company has purchased 25,000 tons of heavy melting steel at \$24.50 to \$25. There has also been heavy buying of wrought-iron scrap and carwheels, and prices of nearly all kinds of scrap have been advanced. Quotations covering eastern Pennsylvania and taking freight rates from 35c. to \$1.35 per gross ton, are as follows:

No. 1 heavy melting steel.....	\$24.00 to \$25.00
Old steel rails, rerolling.....	31.00 to 33.00
Low phos. heavy melting steel scrap..	34.00 to 35.00
Old iron and steel axles (for export) ..	43.00 to 45.00
Old iron rails.....	28.00 to 29.00
Old carwheels.....	22.50 to 23.50
No. 1 railroad wrought.....	32.00 to 33.00
Wrought-iron pipe.....	20.50 to 21.50
No. 1 forge fire.....	18.00 to 19.00
Bundled sheets.....	15.00 to 16.00
No. 2 busheling.....	13.50 to 14.50
Machine-shop turnings.....	14.50 to 15.50
Cast borings.....	15.50 to 16.50
No. 1 cast.....	23.00 to 24.00
Grate bars, railroad.....	16.50 to 17.00
Stove plate.....	17.50 to 18.00
Railroad malleable.....	18.00 to 18.50

## Cleveland

CLEVELAND, OHIO, March 20, 1917.

**Iron Ore.**—Embargoes placed on ore when the railroad strike was threatened have been lifted after being enforced two or three days, and shipments from docks are again being made at a fairly good rate, although the movement is not as heavy as at this time a year ago. The avoidance of the railroad strike has relieved ore shippers of a great deal of anxiety, as a strike even of short duration would have meant an increase in the amount of ore at docks at the opening of navigation, and this amount is now much larger than this time a year ago. Dock shipments for the next few weeks will be very heavy, providing cars are available. The market is inactive. We quote prices as follows, delivered lower Lake ports: Old range Bessemer, \$5.95; Mesaba Bessemer, \$5.70; old range non-Bessemer, \$5.20; Mesaba non-Bessemer, \$5.05.

**Pig Iron.**—A fairly active buying movement has developed for the first half of next year's delivery and is largely in foundry iron, but some malleable iron is also being sold for that delivery. Producers have been holding off, but nearly all furnaces in the northern Ohio territory have now opened their books for 1918 orders as the result of the desire of their trade to be covered with contracts. Two Cleveland selling agencies report sales so far this month in excess of 100,000 tons. The market is reasonably firm with the price tendency still upward. Foundry and malleable iron is quoted \$33 to \$35 by Ohio furnaces for the first half of next year. However the high price is the more general quotation for that delivery. First half sales in Buffalo have been made at \$34 by one interest, which is now asking \$35. The prevailing prices are not deterring consumers from placing orders, although shipments on some of this iron will not be made short of a year, as foundries want to know what their pig iron will cost them before taking contracts for castings. For early shipment and for the last half of this year foundry iron is quoted at \$36 to \$38 by northern Ohio furnaces, most producers holding to the latter price. These quotations represent an advance of \$1 a ton in the minimum price. Southern iron has been advanced \$2 a ton, some sales being made at \$30, Birmingham, for No. 2, which is now considered the minimum price. Virginia iron has been advanced \$1 a ton to \$33 for delivery during the last half of 1918. Among new inquiries is one from a nearby foundry for 3000 to 5000 tons of foundry iron for first half of next year. We quote delivery to Cleveland as follows:

Bessemer .....	\$36.95 to \$37.95
Basic .....	33.95
Northern No. 2 foundry .....	37.30 to 38.30
Southern No. 2 foundry .....	34.00 to 36.00
Gray forge .....	32.95 to 33.95
Ohio silvery, per cent silicon .....	43.62 to 44.62

**Finished Iron and Steel.**—The demand is moderately active for steel for as early deliveries as the mills can make. Mills are having no trouble in getting for delivery within two or three months, 3.75c. for steel bars, 4c. for structural material, and 5.50c. for plates. The demand for plates continues very heavy, and prices range 5.25c. to 5.50c., Pittsburgh and higher. There is a good demand from structural shops for shapes and plates. The only new contract placed in building lines is for 250 tons for a factory building for the National Screw & Tack Company, Cleveland, which was taken by the Riverside Bridge Company. A leading Ohio automobile company has placed an order for 20,000 tons of steel bars for the last half, and it is understood to have also placed large orders for other requirements, including alloy steel and sheets. There is an inquiry in the local market from a Pittsburgh broker for 25,000 tons of rerolling billets. Forging billets are very scarce and are quoted as high as \$100 by a Cleveland mill. Hard steel bars range from 3c. to 3.25c., at mill. Quotations on iron bars range from 3c. to 3.25c., Pittsburgh. The demand for blue annealed sheets is very heavy, and other grades are in fairly good demand. We quote sheets at 5c. to 5.50c., Ohio mill, for No. 28 black; 5c. to 5.25c. for No. 10 blue annealed, and 6.75c. to 7.50c. for No. 28 galvanized. Warehouse shipments have been interfered with during the past few days by

railroad embargoes due to the threatened strike. Warehouse prices are unchanged at 4.35c. for steel bars, 5.60c. for plates, 4.60c. for structural material, 5.50c. for hoops, and 5.50c. for blue annealed sheets.

**Bolts, Nuts and Rivets.**—Bolt and nut makers have decided not to open their books for probably 30 days for last half contracts, and for the present will not change prices. An advance will probably be made for contracts for delivery beyond July. Rivet manufacturers plan to cover their trade with contracts for third quarter at the advanced prices noted last week. We quote rivets at 4.75c., Pittsburgh, for structural and 4.85c. for boiler rivets. Bolt nut discounts are as follows:

Common carriage bolts,  $\frac{3}{4}$  x 6 in., smaller or shorter, rolled thread, 40 and 10; cut thread, 40 and 2½; larger or longer, 30 and 5. Machine bolts with h.p. nuts,  $\frac{3}{4}$  x 4 in., smaller or shorter, rolled thread, 50; cut thread, 40 and 10; larger or longer, 35 and 5. Lag bolts, cone point, 50. Square and hexagon, h.p. nuts, blank, \$2.50 off the list; tapped, \$2.30 off. C.p.c. and t. hexagon nuts, all sizes, blank, \$2.25 off; tapped, \$2 off. Cold pressed semi-finished hexagon nuts, 50, 10 and 5 off.

**Old Material.**—The market is firmer, price advances having been made on several grades. The American Steel & Wire Company came in the market a few days ago for a moderate tonnage of heavy melting steel scrap for Cleveland, some of which has been purchased. This inquiry had a tendency to stiffen the local market. Mills generally are still out of the market and have good-sized stocks. There is a fair volume of activity among dealers who are now doing some speculative buying. Dealers are paying \$23, and in some cases slightly higher, for heavy melting steel scrap. We quote f.o.b. Cleveland as follows:

Per Gross Ton	
Steel rails .....	\$21.00 to \$21.50
Steel rails, rerolling .....	26.00 to 27.00
Steel rails under 3 ft. ....	26.00 to 26.50
Iron rails .....	28.00 to 28.50
Steel car axles .....	47.00 to 48.00
Heavy melting steel .....	22.50 to 23.00
Carwheels .....	21.00 to 21.50
Relaying rails, 50 lb. and over ..	37.00 to 38.00
Agricultural malleable .....	16.50 to 17.00
Railroad malleable .....	22.00 to 22.50
Steel axle turnings .....	16.50 to 17.00
Light bundled sheet scrap .....	15.00 to 15.50

Per Net Ton	
Iron car axles .....	\$44.00 to \$45.00
Cast borings .....	9.75 to 10.00
Iron and steel turnings and drillings ..	9.50 to 9.75
No. 1 busheling .....	18.50 to 19.00
No. 1 railroad wrought .....	26.00 to 26.50
No. 1 cast .....	18.50 to 19.00
Railroad grate bars .....	14.25 to 14.50
Stove plate .....	13.50 to 14.00

**Coke.**—Foundry coke has continued fairly active, and it is believed that most of the consumers are now under contract except those who prefer to take their chances with the market and not cover at the present time. Standard Connellsville foundry coke is quoted at \$7 per net ton at oven for the full year from July 1, and \$7.50 for the last half. However, some producers are asking as high as \$8.50 to \$9. Virginia coke has sold for \$8 for the last half. Connellsville foundry coke for prompt shipment is quoted from \$12 to \$13. Furnace coke is softer, being quoted at \$9 for prompt shipment. Coke shipments are better as result of an improvement in the car situation.

## Cincinnati

CINCINNATI, OHIO, March 21, 1917—(By Wire.)

**Pig Iron.**—The scattered inquiry for foundry iron is good, especially for last half shipment. Melters also seem to be interested in a supply for the first half of 1918. The Southern furnaces for this delivery have only been making nominal quotations that range all the way from \$33 to \$35, Birmingham. Southern order books have not yet been opened, and very little business has been transacted with the exception of a few lots that were sold with shipments beginning in the fourth quarter of this year. The minimum price of Southern No. 2 foundry is \$30, Birmingham basis, for any shipment this year, although some producers are asking and in some instances obtaining a higher price where favorite brands are wanted. Contracting is principally limited to small lots. A sale worthy of note was made locally of 500

tons of gray forge for prompt shipment at a figure close to the price for No. 2. Northern iron for first half shipment this year is almost unobtainable, and for the last half from \$36 to \$37, Iron-ton, is quoted. Inquiries for the first half of next year generally bring out a quotation of \$40, but Iron-ton contracts have been made lower than this. It is generally understood that most of the inquiries for that delivery are simply put out as feelers. Ohio silvery irons are so scarce that no stable prices can be obtained for this year's shipment, but quotations on 8 per cent analysis run from \$42 to \$48 at furnace, and sales agents make a general proviso that all offers have to be submitted to the furnaces before acceptance. The Virginia producers who recently opened their books for the first half of 1918 have advanced prices to \$33 at furnace for No. 2 X. It is rumored that a sale of 10,000 tons of basic was made to a nearby rolling mill to be shipped from a southern Ohio furnace. Based on freight rates of \$2.90 from Birmingham, and \$1.26 from Iron-ton, we quote, f.o.b. Cincinnati, as follows:

Southern coke, No. 1 f'dry and 1 soft.	\$33.40 to \$33.90
Southern coke, No. 2 f'dry and 2 soft.	32.90 to 33.40
Southern coke, No. 3 foundry.	32.40 to 32.90
Southern coke, No. 4 foundry.	31.90 to 32.40
Southern gray forge	28.90 to 29.40
Ohio silvery, 8 per cent silicon.	43.26 to 44.26
Southern Ohio coke, No. 1.	37.76
Southern Ohio coke, No. 2.	37.26
Southern Ohio coke, No. 3.	36.76
Southern Ohio malleable Bessemer.	37.26
Basic, Northern	37.26
Lake Superior charcoal	37.20
Standard Southern carwheel	32.90

(By Mail)

**Finished Material.**—Store prices on mill and factory supplies are unchanged, but advances are expected. Wire nails are quoted from warehouse to-day at \$3.60 per keg base; barb wire, 4.40c. to 4.45c.; steel bars, 4.15c.; twisted steel bars, 4.30c. base; rounds and squares, 2-in. and over, 4.45c.; structural shapes, 4.40c.; plates, ¼-in. and heavier, 5.50c.; 3/16-in. 5.60c.; No. 8 gage, 5.65c.; No. 10 blue annealed sheets, 5.50c.; machine bolts, ¾ x 4 in. and smaller, 50 per cent discount; larger and longer, 30 and 10 per cent discount; hack saws, 10 per cent discount; set screws, 45 per cent discount, and files 50 and 10 per cent discount. The mill price on No. 28 galvanized sheets is 7.40c. to 7.55c.; No. 28 black, 5.40c. to 5.55c.; No. 10 blue annealed, 5.15c., all f.o.b. Cincinnati or Newport, Ky. Orders are coming in at a satisfactory rate, but freight embargoes have had a considerable effect in holding up outbound shipments, especially to points South and East.

**Old Material.**—Business was slack the last three days of last week, due to the uncertain railroad labor situation. Outside shipments were embargoed, and very little material was received. However, local foundries took several small lots of scrap for immediate use. It is reported that the railroad freight embargo situation is now clearing up and that shipments will be more nearly normal in a short time. The following are dealers' prices f.o.b. at yards, southern Ohio and Cincinnati:

Per Gross Ton	
Bundled sheet scrap.	\$15.00 to \$15.50
Old iron rails	24.75 to 25.25
Relaying rails, 50 lb. and up.	28.25 to 28.75
Rerolling steel rails	24.75 to 25.25
Heavy melting steel scrap.	21.25 to 21.75
Steel rails for melting	21.25 to 21.75
Per Net Ton	
No. 1 railroad wrought.	\$22.00 to \$22.50
Cast borings	6.50 to 7.00
Steel turnings	6.50 to 7.00
Railroad cast	16.25 to 17.25
No. 1 machinery cast.	18.00 to 18.50
Burnt scrap	10.25 to 10.75
Iron axles	33.50 to 34.00
Locomotive tires (smooth inside)	28.00 to 28.50
Pipes and flues	13.75 to 14.25
Malleable cast	15.25 to 15.75
Railroad tank and sheet.	12.25 to 12.75

**Coke.**—Shipments from all fields were practically cut off Friday and Saturday of last week, but the railroads began to rush cars forward this week, and it is not believed that any of the foundries in this vicinity will be compelled to close down for the want of fuel. All makes of foundry coke are still bringing from \$12 to \$14.50 per net ton at oven for prompt shipment, while contract figures range from \$7.50 to \$9.50. Contracting was comparatively heavy the first two weeks

of March, but is now slackening up. Most contracts were made for shipment to begin July 1 and extending through the present year, while there was some buying of a full 12 months' supply by the stove foundries especially. Furnace coke is slow as far as new business is concerned, and contract figures range all the way from \$7.50 to \$8 per net ton at oven.

## St. Louis

ST. LOUIS, Mo., March 19, 1917.

**Pig Iron.**—Demand for pig iron during the week continues, but the transactions have not been numerous because of the inability of furnaces and consumers to get together readily. Melters are finding that they are using their pig iron faster than they expected. Some sales have been made for the first half of 1918 on a basis of about \$30, Birmingham, but these have not been many. The chief transactions in this class were one of 500 tons of No. 2 Southern foundry and one of the same amount of No. 3 Southern. Prompt and last half business is being held at \$29 to \$31 per ton, but the actual figures depend altogether upon the conditions between buyer and seller at the time of closing the sale. Sales other than those mentioned include one of 300 tons of No. 3 Southern, two of 600 tons each of No. 2 Southern and a considerable number of small lots, all for last half. The local furnace has made a number of sales for prompt, second quarter and last half delivery at \$35.50 to \$36 furnace, St. Louis.

**Coke.**—Contracts for foundry coke for delivery through to July, 1918, have been put on a basis of \$9 to \$10 per ton at oven for New River coke, \$8.25 to \$8.75 for Connellsville and \$8 to \$8.50 for Virginia coke through the rest of the year.

**Old Material.**—The activity of the scrap market is largely due to the efforts of dealers to cover their shortages and make deliveries, as the consuming interests are not very strongly in the market at present. The inability of railroads to pick up their scrap and move it to market is holding much material on the lines. Steel scrap, No. 1 railroad wrought and cast scrap are especially wanted and are commanding prices which would not be likely to prevail long after the relief of shortages. However, the optimism of the dealers has stiffened the whole list materially, though not many changes in quotations are made. Ability to make delivery is the most important element in the situation. We quote dealers' prices, f.o.b. customers' works, St. Louis industrial district, as follows:

Per Gross Ton	
Old iron rails	\$28.00 to \$28.50
Old steel rails, rerolling.	29.50 to 30.00
Old steel rails, less than 3 ft.	26.50 to 27.00
Relaying rails, standard section, subject to inspection	36.00 to 38.00
Old carwheels	21.00 to 21.50
No. 1 railroad heavy melting steel scrap	24.00 to 24.50
Heavy shoveling steel	19.00 to 19.50
Ordinary shoveling steel	19.00 to 19.50
Frogs, switches and guards cut apart	24.50 to 25.00
Ordinary bundled sheet scrap.	15.00 to 15.50

Per Net Ton	
Iron angle bars	\$26.50 to \$27.00
Steel angle bars	22.50 to 23.00
Iron car axles	35.00 to 35.50
Steel car axles	34.50 to 35.00
Wrought arch bars and transoms.	28.00 to 28.50
No. 1 railroad wrought.	25.50 to 26.00
No. 2 railroad wrought.	24.50 to 25.00
Railroad springs	24.00 to 24.50
Steel couplers and knuckles.	25.50 to 26.00
Locomotive tires, 42 in. and over, smooth inside	33.50 to 34.00
No. 1 dealers' forge	18.50 to 19.00
Cast iron borings	10.00 to 10.50
No. 1 busheling	18.00 to 18.50
No. 1 boilers, cut to sheets and rings	14.50 to 15.00
No. 1 railroad cast scrap.	16.00 to 16.50
Stove plate and light cast scrap.	11.50 to 12.00
Railroad malleable	17.50 to 18.00
Agricultural malleable	16.50 to 17.00
Pipes and flues	15.50 to 16.00
Heavy railroad sheet and tank scrap.	14.50 to 15.00
Railroad grate bars	13.00 to 13.50
Machine-shop turnings	10.50 to 11.00
Heavy axle and tire turnings.	13.00 to 13.50

**Finished Iron and Steel.**—Light rails have been taken as freely as mills can provide them at \$50, Pittsburgh, mostly by the coal interests. The lumber interests appear to be relying on their surplus stocks for

their needs or on their old rails relaid for new sections. Spikes are stronger at \$3.60 to \$3.75, heavy to light weights, Chicago, and angle bars are firm at \$4.25 to \$4.75. Movement out of warehouse is very active at stiffly held prices, which we quote as follows: Soft steel bars, 4.05c.; iron bars, 4c.; structural material, 4.30c.; tank plates, 5.55c.; No. 10 blue annealed sheets, 5.55c.; No. 28 black sheets, cold rolled, one pass, 5.75c.; No. 28 galvanized sheets, black sheet gage, 8c.

## Birmingham

BIRMINGHAM, ALA., March 19, 1917.

**Pig Iron.**—By March 17 the Birmingham iron market had advanced to a minimum of \$30 for any delivery. This was an advance of \$2 per ton in one week. The leading interest on Thursday announced a basis of \$30 for the rest of the year, after having made sales the preceding week at \$27.50, \$28 and \$29. Brokers report having sold carload lots of No. 3 at \$30 and of No. 2 at \$31. The largest foundry-iron producer is contenting itself with caring for regular customers on a basis of \$30, and has taken on some new business at that figure. The Woodward Iron Company has booked additional basic around \$30 for the last half of the year, and on July 1 will put a third furnace on basic, making foundry only at its Vanderbilt stacks. One manufacturer reports having sold 2000 tons of special analysis iron for last half delivery at \$35, a price heretofore unheard of in the district. Some special iron was also sold for the first half of 1918 at \$33, and for last-half delivery this year at \$32. Charcoal iron has advanced to \$34 and \$35. In spite of the rapid advance consumers still inquire for metal. All iron makers are careful in the disposition of the remaining 1917 tonnage and constantly retire after making some sales at the most recent advances. Two are entirely out of the market. The Southern melt of iron continues at maximum. Shipments fell off to some extent in February. Car service figures for Alabama in that month show a total of 75,036 cars, compared with 77,400 in February, 1916, which, however, had one more day. The Sloss-Sheffield Steel & Iron Company shipped 5000 tons via the Tennessee River to the West from Florence and Sheffield in February. We quote, per gross ton, f.o.b. Birmingham district furnaces, as follows:

No. 1 foundry and soft.....	\$30.50 to \$31.50
No. 2 foundry and soft.....	30.00 to 31.00
No. 3 foundry.....	29.50 to 30.50
No. 4 foundry.....	29.25 to 30.25
Gray forge.....	29.00 to 30.00
Basic.....	30.00 to 31.00
Charcoal.....	34.00 to 35.00

**Cast-Iron Pipe.**—Water pipe was advanced by the leading interest on Monday \$2 per ton, in response to the advance in pig iron. Consumers are paying the advance with great reluctance, but pipe makers cannot help the situation. Absolute necessities bring buyers into the market. We quote, per net ton, f.o.b. pipe shop yards, as follows: 4-in., \$42; 6-in. and upward, \$39, with \$1 added for gas pipe and special lengths.

**Old Material.**—Dealers are doing a comfortable business, and the recent advances in prices are holding good, with some prospect of a further rise in response to activity in the pig-iron market. It is anticipated that much more scrap will be used at present pig-iron prices. Steel scrap is in specially good demand. We quote, per gross ton, f.o.b. dealers' yards, as follows:

Old steel axles.....	\$35.00 to \$36.00
Old steel rails.....	19.00 to 19.50
No. 1 wrought.....	18.50 to 19.50
No. 1 melting steel.....	16.00 to 16.50
No. 1 machinery.....	16.50 to 17.00
Carwheels.....	17.00 to 18.00
Tram carwheels.....	12.00 to 12.50
Stove plate and light.....	11.00 to 11.50
Machine-shop turnings and borings...	8.00 to 8.50

**Bars.**—Steel bars, f.o.b. Birmingham, in carload lots, are selling at 3.50c. to 3.75c., and iron bars at 3.30c. to 3.50c.

**Coal and Coke.**—The minimum on spot coke has reached \$12.50 per net ton at oven, and that on contract coke is around \$9.50 for standard beehive makes, with

little to be had. Furnace coke sells at \$5 and \$6. Blacksmithing coal has advanced to \$4. Spot steam coal is selling at \$3 and contract coal brings around \$2.50 and sometimes a little more. The market is very active.

## New York

NEW YORK, March 21, 1917.

**Pig Iron.**—A large pump manufacturing interest has closed contracts for approximately 23,000 tons of foundry iron for shipment over the first half of 1918 to Massachusetts, New Jersey and Ohio plants. The same interest is still negotiating for 4000 to 5000 tons of coke and charcoal foundry iron and for small lots of silvery iron for Western shipment. The lion's share of the tonnage closed in the East, it is understood, went to Virginia furnaces, but the Northern business was divided among several furnaces. The portion going to Massachusetts brought a little less than \$35 delivered, equivalent to about \$32, Buffalo furnace. Sales of No. 2 foundry iron were made by Buffalo furnaces at \$32.50 to \$33 at furnace, for shipment over the first half of next year. Several large consumers are reported to have quietly covered contracts for next year, and one of the Buffalo producers has sold practically all of its capacity for the first quarter of 1918 as a result. Eastern Pennsylvania furnaces again have advanced prices \$2 per ton, about 4000 tons going at \$38 to \$40 per ton for No. 2 at furnace for last-half shipment. Lots of 200 to 300 tons have sold at \$39.98, delivered in New England, also for last half. Interest has centered in the closing of contracts by the largest Virginia producers at a further price advance. Total sales of this interest in the last two weeks have amounted to about 40,000 tons, at prices ranging from \$31 to \$33 at the furnace, for No. 2 foundry, over first half of 1918. The Alabama market also has gained in strength while still unsettled with a wide range in prices. Local agents have sold No. 2 foundry at \$29 to \$30, Birmingham, for Western and Southern shipment. To-day some few lots are reported to have been sold at \$31, furnace, for second quarter 1917 shipment. Some Alabama warrant iron was sold at \$28.75 to \$29. Conditions surrounding resale lots reported offered at several dollars per ton below the market are not clear. Low-phosphorus iron is strong and higher, some small lots selling between \$70 and \$75 at eastern Pennsylvania furnace. One lot of 2000 tons of standard low phosphorus, however, was sold at \$65 furnace for export to Japan. Several new inquiries for Bessemer iron have been put out on foreign account, including one lot of 4000 tons for Italy in April, May, June and July. A lot of 11,000 tons for foundry and low-phosphorus iron wanted by an electrical equipment manufacturer for shipment to its works in New York, Massachusetts and Pennsylvania over the first half of 1918. Another inquiry comes from a copper interest in Utah amounting to 1850 tons, including 1150 tons of No. 1 for shipment over the last half of 1917. We quote at tidewater for early delivery: No. 1 foundry, \$39.20 to \$41.20; No. 2 X, \$38.70 to \$40.70; No. 2 plain, \$38.20 to \$39.20; Southern iron at tidewater, \$33.75 to \$34.75 for No. 1 and \$33.25 to \$34.25 for No. 2 foundry and No. 2 soft.

**Ferroalloys.**—The ferromanganese market is less active than for several weeks. Practically all British producers are out of the market for any delivery, the last quotation having been \$185, seaboard. Domestic producers do not seem to have much to offer for delivery before the latter part of the year, for which they are asking \$250 to \$275, delivered, depending on the quantity desired. A few lots have been sold for early delivery at \$300, delivered, which may be regarded as the quotation. New demand is very small, but there is some anxiety by consumers for deliveries on contract and specifications are urgent. Receipts from abroad in February, according to Government data furnished to THE IRON AGE, were over 6300 tons, which exceeds by a small margin the receipts in January. It is stated that offers of 80c. per unit for Brazilian manganese ore have failed to result in sales being consummated because of difficulty in engaging freight room. With the present

freight rate added, a sale of ore at such a price would bring the value at seaboard to from 90c. to 95c. a unit. These are record prices. Spiegeleisen is strong for early delivery, 1000 or more tons having been sold to a Central Western consumer. The quotation for early delivery is about \$75, furnace, with about \$65 asked for last half. There is no change in the situation regarding 50 per cent ferrosilicon. Specifications on contract are insistent and the market is strong and active. Consumers desiring the alloy for early delivery have to pay at least \$250 for it delivered.

**Structural Material.**—Protection of prices submitted on structural shapes before the last advance went into effect stimulated the placing of contracts for fabricated steel to be used in the erection of buildings and bridges in the Eastern territory, but this time limit has expired. Independent steel companies in the last day or two have advanced prices again \$2 to \$5 per ton, the minimum price for standard sections now being 3.75c., Pittsburgh, for shipment in the next 4 to 6 months, and several of the Eastern structural mills are asking 4c. a pound for similar shipments. The Carnegie Steel Company, while still holding to 3.60c. for shipment at convenience of the mill, is selling at 3.75 to 4c. for earlier deliveries. The largest fabricators are taking business on the basis of 3.75c., Pittsburgh, for the plain material. The Pennsylvania Railroad is in the market for six bridges calling for 1800 tons. The New York Central is taking bids on the elimination of five grade crossings, calling for 1000 tons and on several bridges calling for 500 tons. The same road has ordered 2500 tons for a warehouse in Cleveland from the Massillon Bridge & Iron Works. Among the principal building contracts closed is an office building in Waterbury, Conn., for the Chase Brass Company, requiring 1000 tons; a building at Washington for the Commercial National Bank, 500 tons, and column cores for the Strawbridge & Clothier building, Philadelphia, 700 tons, all placed with the American Bridge Company. The Mosher Mfg. Company, Dallas, Texas, has placed an order for 1350 tons for a bank building at Dallas. The Vulcan Iron Works will fabricate 821 tons of Bethlehem and standard sections for a library building at the Leland Stanford, Jr., University. The Hay Foundry & Iron Works will fabricate 350 tons for a nurses' home at Bellevue Hospital, New York City, and the Passaic Steel Company 800 tons for an Axlerod Apartment. Other contracts include 300 tons for the James A. Farrell residence at South Norwalk, Conn. Interest is centered in steel requirements for extending and improving private and Government navy yards. It is estimated that about 25,000 to 30,000 tons of shapes will be needed for these crane runways and machine shops. On about 5000 tons of steel for aeroplane hangars for the United States Government the Ferguson Steel Company submitted the lowest tender. One sale for about 1000 tons out of stock was made for export to Canada for a paper mill at Montreal. Export inquiries of the last few days amount to 5000 to 6000 tons, some of which are understood to have been closed. Domestic contracts expected to be placed in the next day or two include 2500 tons for the Fox department store at Hartford and 1000 tons for a loft building at 6 West Forty-eighth Street, New York City. Several promising projects, however, have been abandoned because of the high prices prevailing, including an extension to Woodward Hotel, New York City, a 14-story office building at Chicago, and a large contract in the West; the inquiries combined amounting to 5000 tons. We quote mill shipments of shapes in three to five months at 3.919c. to 4.169c., New York. Warehouse shipments are now at 4.50c., New York.

**Billets and Bars.**—The offering of several large tonnages of billets for shipment beginning at once and extending over next year has attracted considerable attention. One interest is endeavoring to draw bids on about 200,000 tons of rerolling billets for shipment at the rate of about 8000 tons a month beginning in April; another interest is offering 100,000 tons, half of which is soft and the other half hard steel for shipment beginning in the next few months. Still another interest who was supposed to have capacity sold until July, is

now seeking orders for earlier shipment. These are not resale lots. Agents of the Allies are canceling contracts for heavy forgings when specifications have not been adhered to closely. There is a good demand for bars in small lots from domestic consumers, but mills are well sold and are refusing most overtures. There is a pressing demand for wire rods and prices ranging all the way from \$70 to \$125 per ton, f.o.b. mill, depending upon the carbon, tonnage and requirements, but no orders are being taken for shipment after the second quarter of this year. We quote mill shipments of bar iron at 3.669c., and steel bars at 3.919c., New York. Out of warehouse iron bars are 4c., and steel bars 4.35c., New York.

**Steel Plates.**—An extremely strong tone prevails and the tendency of prices is still upward. At the moment Government requirements for plates and shapes for war craft take precedence over all other contracts. The building of battle and scout cruisers for which contracts have just been closed will require approximately 98,000 tons of steel plates and shapes, the major portion of which is expected to be furnished by the United States Steel Corporation. Contracts for the 16,000 tons of armor plate required for the building of the battle cruisers have just been awarded to the Bethlehem Steel Company, the Carnegie Steel Company and Midvale Steel & Ordnance Company based on prices submitted last November. Bids on the 4000 tons of armor plate required for the battle cruisers to build in Government yards will be taken early in April. Atlantic coast ship builders are still actively in the market. One interest wants 17,000 tons and another 20,000 tons. One ship yard on the Delaware River recently closed for a little over 20,000 tons to cover contracts for several more boats recently accepted. Export inquiries are of daily occurrence and large in tonnage, but few orders are being accepted. Eastern Pennsylvania structural mills are asking 7c. to 7½c. for hull plates, 6c. to 6½c. for tank plates, 9c. for flange plates, 9½c. for locomotive firebox plate and 15.4c. for marine boiler plate, shipment in 6 to 9 months. The largest interest is still nominally asking 4½c., Pittsburgh, for tank plates and 5c. for ship plates for shipment at convenience of the mill, but it is now the practice to sell plates and shapes for ship construction at a uniform price, 5c. per pound, Pittsburgh, for example, for deferred delivery. We quote best deliveries on universal plates at 5.159c. to 5.669c., New York; ordinary tank plates at 5.419c. to 6.169c., and ship plates at 7.169c. to 7.669c., but indefinite delivery plates at 4.669c., New York. Out of store we quote 5½c.

**Cast-Iron Pipe.**—Much to the surprise of cast-iron pipe manufacturers, the contract at Rochester, N. Y., for 10,750 tons of 37-in. pipe was awarded to the T. A. Gillespie Company, which will furnish lock-bar steel pipe. As the successful bidder named \$494,830, against \$592,153.07, the lowest bid for cast iron, it is inferred that the company has contracts for plate placed long ago at much lower prices than are now current. The city of Rochester has also awarded a contract for 1065 tons of pipe and fittings, from 6 to 30 in., on which the Warren Foundry & Machine Company was the successful bidder at \$41.26 for the 30-in. and \$41.72 for 6 to 20 in. R. D. Wood & Co. were low bidders on 360 tons for New York City at \$41 for the Brooklyn lot, and \$41.65 Staten Island. The city of Boston will open bids March 26 on 2600 tons of 4 to 40 in. Quite a number of smaller inquiries are in the market and the general demand is increasing despite the high prices now prevailing. As pig iron is rapidly advancing, it would not be surprising to find the price of pipe advanced shortly \$2 to \$3 per ton. For the present, carload lots of 6-in., class B and heavier, are quoted at \$42.50 per net ton, tidewater, with class A and gas pipe taking the usual extra of \$1 per ton.

**Old Material.**—Much greater activity prevails, with corresponding strength in prices. Heavy transactions have taken place in heavy melting steel scrap in the past week, but at present the demand is running more strongly to wrought scrap, borings, turnings and specialties. Indications continue to favor advancing

prices. Brokers quote buying prices as follows to local dealers and consumers, per gross ton, New York:

Heavy melting steel scrap.....	\$23.00 to \$23.50
Relaying rails .....	40.00 to 41.00
Revolving rails .....	31.00 to 32.00
Iron car axles.....	42.00 to 43.00
Steel car axles.....	45.00 to 46.00
No. 1 railroad wrought.....	32.00 to 33.00
Wrought-iron track scrap.....	26.00 to 27.00
No. 1 yard wrought, long.....	26.00 to 27.00
Light iron .....	8.00 to 9.00
Cast borings (clean).....	13.50 to 14.00
Machine-shop turnings.....	12.50 to 13.00
Mixed borings and turnings.....	12.50 to 13.00
Wrought-iron pipe (not galvanized or enameled).....	19.50 to 20.00

Everything in the line of cast scrap is in demand at higher prices. Large consumers have entered the market and bought for delivery in the last six months of the year at a sharp advance over last week's prices. Carwheels are very strong. The prices given below are those paid by consumers purchasing in good quantities, but foundries in New York City and Brooklyn can probably secure small lots of Nos. 1 and 2 cast from nearby dealers at \$1.50 to \$2 less per gross ton, New York.

No. 1 cast.....	\$24.00 to \$25.00
No. 2 cast.....	22.00 to 23.00
Stove plate .....	16.00 to 17.00
Locomotive grate bars.....	16.00 to 17.00
Old carwheels .....	23.50 to 24.00
Malleable cast (railroad).....	22.50 to 23.00

## Buffalo

BUFFALO, N. Y., March 20, 1917.

**Pig Iron.**—The market is exceedingly strong, with an urgent demand both for prompt and extended delivery and a continued advancing tendency in prices. Malleable has been sold in the last few days at \$39, furnace, and \$40 is now being asked by most producers. It is a little stronger than other foundry grades on account of its greater scarcity. For the better foundry grades, \$40, furnace, is now the prevailing asking price, and \$39 for even the lower grades. Quite heavy and insistent inquiry is coming in for 1918 delivery, but furnaces hesitate to quote so far ahead, although making exceptions in some cases, particularly for the first half. For charcoal iron \$42 is asked for spot delivery, with \$39 quoted for delivery after the opening of navigation. Very little is for sale, however, either for spot or future delivery. Many furnacemen predict a serious scarcity of all grades of pig iron within 60 to 90 days. We quote for first and second half delivery, f.o.b. furnace, Buffalo, as follows:

High-silicon irons .....	\$39.00 to \$40.00
No. 1 foundry.....	39.00 to 40.00
No. 2 X foundry.....	39.00 to 40.00
No. 2 plain.....	39.00 to 40.00
No. 3 foundry.....	39.00 to 40.00
Gray forge .....	39.00 to 40.00
Malleable .....	39.00 to 40.00
Basic .....	39.00 to 40.00
Bessemer .....	39.00 to 40.00
Charcoal according to brand and analysis (high price for spot).....	39.00 to 42.00

**Old Material.**—There appears to be a shortage of heavy melting steel in this market and dealers claim the price of this commodity is advancing sharply on account of the urgent demand from large consumers. The demand for low-phosphorus scrap is also very strong and No. 1 railroad and machinery cast scrap, wrought scrap, old carwheels and No. 1 busheling scrap show good demand. Dealers' asking prices are as follows, per gross ton, f.o.b. Buffalo:

Heavy melting steel.....	\$24.00 to \$24.50
Low phosphorus .....	32.00 to 36.00
No. 1 railroad wrought .....	28.00 to 29.00
No. 1 railroad and machinery cast.....	22.50 to 23.50
Iron axles .....	45.00
Steel axles .....	45.00
Carwheels .....	23.00 to 23.50
Railroad malleable .....	22.00 to 23.00
Machine shop turnings .....	19.50 to 21.00
Heavy axle turnings .....	16.00 to 16.50
Clean cast borings .....	11.00 to 11.50
Iron rails .....	25.00 to 26.00
Locomotive grate bars .....	15.00 to 15.50
Stove plate .....	14.00 to 14.50
Wrought pipe .....	16.00 to 16.50
No. 1 busheling scrap .....	20.50 to 21.50
No. 2 busheling scrap .....	13.00 to 13.50
Bundled sheet scrap .....	14.00 to 14.50

**Finished Iron and Steel.**—Inquiry is coming in for all lines of finished products, in large volume, espe-

cially contracts for future delivery, notwithstanding some unsettlement was noted for a day or two owing to the threatened railroad strike and the temporary placing of embargoes as well as the sharp price advance of the preceding week. Pressure for additional steel is very heavy.

## British Steel Market

**Tin Plates Firmer—No Offers of American Steel—Ferromanganese Steady**

LONDON, ENGLAND, March 21, 1917—(By Cable).

The Cleveland pig-iron market is quieter and consumers are well covered. Hematite iron is active. Tin plates are firmer at 27s., with large orders booked for April and May delivery. American steel is still nominal, with an absence of offers. Ferromanganese is firm. We quote as follows:

Tin plates coke 14 x 20, 112 sheets, 108 lb., f.o.b. Wales, 27s. against 26s. 6d. last week.  
Ferromanganese, £37 nominal.  
Ferrosilicon, 50 per cent, c.i.f. £35 upward.

## Bethlehem Limestone Operations in New Jersey

The Bethlehem Steel Company is proceeding with the installation of a flux crushing plant at its limestone quarry at McAfee, N. J. The stone produced at this quarry is a high-grade calcite, suitable for blast-furnace and open-hearth consumption. This stone has hitherto been broken by hand and loaded into cars by carts drawn by horses. The new plant will consist of an electric power plant, crushing plant, screening plant, locomotives, steel dump cars and shovels. The complete installation will cost between \$300,000 and \$350,000.

The company has under consideration the installation of electric shovels to load the stone blasted down by well hole shots. It is the intention to supply from this plant, which will have a rated capacity of 3500 tons per 10-hr. day, all the blast-furnace and open-hearth flux required at the Bethlehem works.

## Alan and J. Wood Merger Completed

Negotiations for the acquisition of the J. Wood & Brothers Company, Conshohocken, Pa., with the Alan Wood Iron & Steel Company, Philadelphia and Conshohocken, have been completed, and the transfer of the property has taken place, thus giving the Alan Wood Iron & Steel Company additional capacity of 20,000 tons per annum for the production of sheets and light plates.

"The Story of Steel" is the title of bulletin No. 6 of the Bureau of Safety, Sanitation and Welfare of the United States Steel Corporation. It is written by Donald Wilhelm and covers the mining and transportation of iron ore, the production of coal and coke, the quarrying of limestone, the problems of transportation, the working of the blast furnace and open-hearth furnace, the Bessemer converter, the electric furnace, the finishing mill and the installing and working of safety features.

The Union Electric Light & Power Company, St. Louis, has completed and put in operation the first of three 20,000-kw. units in its generating plant at St. Louis. The other two units will be completely installed by Nov. 1, 1918, the total apparatus representing an outlay of nearly \$3,000,000. The total capacity of the station will then be 116,000 kw.

Figures submitted at the recent annual meeting of the Sloss-Sheffield Steel & Iron Company showed that the company's net earnings for the year ended November 30, 1916, were \$2,200,674, compared with \$805,429 the previous year. Surplus after dividends was \$1,443,624, an increase of \$1,272,987.

## Finished Iron and Steel f.o.b. Pittsburgh

Freight rates from Pittsburgh in carloads, per 100 lb.: New York, 16.9c.; Philadelphia, 15.9c.; Boston, 18.9c.; Buffalo, 11.6c.; Cleveland, 10.5c.; Cincinnati, 15.8c.; Indianapolis, 17.9c.; Chicago, 18.9c.; St. Louis, 23.6c.; Kansas City, 43.6c.; Omaha, 43.6c.; St. Paul, 32.9c.; Denver, 68.6c.; New Orleans, 30.7c.; Birmingham, Ala., 45c. Denver, pipe, 76.1c., minimum carload, 46,000 lb.; structural steel and steel bars, 83.6c., minimum carload, 36,000 lb. Pacific coast (by rail only), pipe, 65c.; structural steel and steel bars, 75c., minimum carload, 50,000 lb.; structural steel and steel bars, 80c., minimum carload, 40,000 lb. No freight rates are being published via the Panama Canal, as the boats are being used in transatlantic trade.

**Structural Material.**—I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in. on one or both legs,  $\frac{1}{4}$  in. thick and over, and zees 3 in. and over, 3.60c. to 3.75c. Extras on other shapes and sizes are as follows:

	Cents per lb.
I-beams over 15 in.	.10
H-beams over 18 in.	.10
Angles over 6 in., on one or both legs	.10
Angles, 3 in. on one or both legs less than $\frac{1}{4}$ in. thick, as per steel bar card, Sept. 1, 1909.	.70
Tees, structural sizes (except elevator, handrail, car truck and conductor rail).	.05
Channels and tees, under 3 in. wide, as per steel bar card, Sept. 1, 1909.	.20 to .80
Deck beams and bulb angles.	.30
Handrail tees	.75
Cutting to lengths, under 3 ft. to 2 ft. inclusive.	.25
Cutting to lengths, under 2 ft. to 1 ft. inclusive.	.50
Cutting to lengths, under 1 ft.	1.55
No charge for cutting to lengths 3 ft. and over.	

**Plates.**—Tank plates,  $\frac{1}{4}$  in. thick, 6 in. up to 100 in. wide, 4.50c., to 5c., base, net cash, 30 days, or  $\frac{1}{2}$  of 1 per cent discount in 10 days, carload lots. Extras are:

	Quality Extras	Cents per lb.
Tank steel		.Base
Pressing steel (not flange steel for boilers)		.10
Boiler and flange steel plates		.15
"A. B. M. A." and ordinary firebox steel plates		.20
Still bottom steel		.30
Locomotive firebox steel		.50
Marine steel, special extras and prices on application.		

### Gage Extras

Rectangular, $\frac{1}{4}$ in. thick, over 6 in. wide to 100 in. wide. Base	
Lighter than $\frac{3}{16}$ in., to $\frac{3}{16}$ in., up to 72 in. wide.	.10
Lighter than $\frac{1}{4}$ in., including $\frac{3}{16}$ in., over 72 in. to 84 in.	.20
Lighter than $\frac{1}{4}$ in., including $\frac{3}{16}$ in., over 84 in. to 96 in.	.30
Lighter than $\frac{1}{4}$ in., including $\frac{3}{16}$ in., over 96 in. to 100 in.	.40
Lighter than $\frac{1}{4}$ in., including $\frac{3}{16}$ in., over 100 in. to 102 in.	.45
Lighter than $\frac{3}{16}$ in., including No. 8, up to 72 in. wide	.15
Lighter than $\frac{3}{16}$ in., including No. 8, over 72 in. to 84 in.	.25
Lighter than $\frac{3}{16}$ in., including No. 8, over 84 in. to 96 in.	.35
Lighter than No. 8, including No. 10, up to 60 in. wide.	.30
Lighter than No. 8, including No. 10, over 60 in. to 64 in.	.35
Up to 72 in. and not less than 10.2 lb. per sq. ft. will be considered $\frac{1}{4}$ in.	
Over 72 in. must be ordered $\frac{1}{4}$ in. thick on edge, or not less than 11 lb. per sq. ft. to take base price.	
Over 72 in. wide, ordered less than 11 lb. per sq. ft., down to weight of $\frac{3}{16}$ in., take price of $\frac{3}{16}$ in.	
Over 72 in., ordered weight $\frac{3}{16}$ in., take No. 8 price.	
Over 72 in., ordered weight No. 8, take No. 10 price.	

### Width Extras

Over 100 in. to 110 in. inclusive.	.05
Over 110 in. to 115 in. inclusive.	.10
Over 115 in. to 120 in. inclusive.	.15
Over 120 in. to 125 in. inclusive.	.25
Over 125 in. to 130 in. inclusive.	.50
Over 130 in.	1.00

### Length Extras

Universal plates 80 ft. long up to 90 ft. long.	.05
Universal plates 90 ft. long up to 100 ft. long.	.10
Universal plates 100 ft. long up to 110 ft. long.	.20

### Cutting Extras

No charge for rectangular plates to lengths 3 ft. and over.	
Lengths under 3 ft. to 2 ft. inclusive.	.25
Lengths under 2 ft. to 1 ft. inclusive.	.50
Lengths under 1 ft.	1.55
Circles 3 ft. in diameter to 100 in.	.30
Circles over 100 to 110 in. (width extra)	.35
Circles over 110 to 115 in. (width extra)	.40
Circles over 115 to 120 in. (width extra)	.45
Circles over 120 to 125 in. (width extra)	.55
Circles over 125 to 130 in. (width extra)	.80
Circles over 130 in. (width extra)	1.30
Circles under 3 ft., to 2 ft., inclusive.	.55
Circles under 2 ft., to 1 ft., inclusive.	.80
Circles under 1 ft.	1.85
Half circles take circle extras.	
Sketches not over four straight cuts, inc. straight taper	.10
Sketches having more than four straight cuts.	.20
Plates sheared to a radius take complete circle extras.	

\*Including extra for width.

**Wire Rods.**—Including chain rods, \$85.

**Wire Products.**—Prices to jobbers, effective March 5: Fence wire Nos. 6 to 9, per 100 lb., terms 60 days or 2 per cent discount in 10 days, carload lots, annealed, \$3.15; galvanized, \$3.85. Galvanized barb wire and

staples, \$4.05; painted, \$3.35. Wire nails, \$3.20. Galvanized nails, 1 in. and longer, \$2.20 advance over base price; shorter than 1 in., \$2.70 advance over base price. Cement-coated nails, \$3.10. Woven wire fencing, 51 per cent off list for carloads, 50 off for 1000-rod lots, 49 off for less than 1000-rod lots.

**Wrought Pipe.**—The following are the jobbers' carload discounts on the Pittsburgh basing card in effect from March 5, 1917, all full weight:

Steel			Iron		
Inches	Black	Galv.	Inches	Black	Galv.
$\frac{1}{8}$ , $\frac{1}{4}$ and $\frac{3}{8}$	53	26 $\frac{1}{2}$	$\frac{1}{8}$ and $\frac{1}{4}$	42	15
$\frac{1}{2}$	57	42 $\frac{1}{2}$	$\frac{3}{8}$	43	16
$\frac{3}{4}$ to 3	60	46 $\frac{1}{2}$	$\frac{1}{2}$	47	29
			$\frac{3}{4}$ to 1 $\frac{1}{2}$	50	36
Lap Weld			Lap Weld		
2	53	40 $\frac{1}{2}$	1 $\frac{1}{4}$	36	21
2 $\frac{1}{2}$ to 6	56	43 $\frac{1}{2}$	1 $\frac{1}{2}$	42	34
7 to 12	53	39 $\frac{1}{2}$	2	43	29
13 and 14	43 $\frac{1}{2}$	..	2 $\frac{1}{2}$ to 4	45	32
15	41	..	4 $\frac{1}{2}$ to 6	45	32
			7 to 12	44	31
Reamed and Drifted			Reamed and Drifted		
1 to 3, butt.	58	44 $\frac{1}{2}$	$\frac{3}{4}$ to 1 $\frac{1}{2}$ , butt.	45	28
2, lap	51	38 $\frac{1}{2}$	1 $\frac{1}{4}$ , lap	31	15
2 $\frac{1}{2}$ to 6, lap.	54	41 $\frac{1}{2}$	1 $\frac{1}{2}$ , lap	37	22
			2, lap	38	23
			2 $\frac{1}{2}$ to 4, lap.	41	26
Butt Weld, extra strong, plain ends			Butt Weld, extra strong, plain ends		
$\frac{1}{8}$ , $\frac{1}{4}$ and $\frac{3}{8}$	49	31 $\frac{1}{2}$	$\frac{1}{8}$ , $\frac{1}{4}$ and $\frac{3}{8}$	42	25
$\frac{1}{2}$	54	41 $\frac{1}{2}$	$\frac{1}{2}$	47	34
$\frac{3}{4}$ to 1 $\frac{1}{2}$	58	45 $\frac{1}{2}$	$\frac{3}{4}$ to 1 $\frac{1}{2}$	51	36
2 to 3	59	46 $\frac{1}{2}$			
Lap Weld, extra strong, plain ends			Lap Weld, extra strong, plain ends		
2	51	39 $\frac{1}{2}$	1 $\frac{1}{4}$	38	23
2 $\frac{1}{2}$ to 4	54	42 $\frac{1}{2}$	1 $\frac{1}{2}$	43	29
4 $\frac{1}{2}$ to 6	53	41 $\frac{1}{2}$	2	45	32
7 to 8	49	35 $\frac{1}{2}$	2 $\frac{1}{2}$ to 4	47	35
9 to 12	46	30 $\frac{1}{2}$	4 $\frac{1}{2}$ to 6	46	34
			7 to 8	40	28
			9 to 12	35	23

To the large jobbing trade an additional 5 per cent is allowed over the above discounts, which are subject to the usual variation in weight of 5 per cent. Prices for less than carloads are two (2) points lower basing (higher price) than the above discounts on black and three (3) points on galvanized, but in some sections of the country discounts on less than carloads are three (3) points less (higher price) than the carload discount on both black and galvanized steel pipe.

On butt and lap weld sizes of black iron pipe, discounts for less than carload lots to jobbers are four (4) points lower (higher price) than carload lots, and on butt and lap weld galvanized iron pipe are five (5) points lower (higher price).

**Boiler Tubes.**—Discounts on less than carloads freight to be added, effective from Nov. 1, 1916, except 3 to 4  $\frac{1}{2}$  in. steel from Nov. 20, are as follows:

Lap Welded Steel	Standard Charcoal Iron
1 $\frac{1}{2}$ in.	23
1 $\frac{3}{4}$ and 2 in.	35
2 $\frac{1}{4}$ in.	32
2 $\frac{1}{2}$ in.	38
2 $\frac{1}{2}$ and 2 $\frac{3}{4}$ in.	43
3 and 3 $\frac{1}{4}$ in.	44
3 $\frac{1}{2}$ to 4 $\frac{1}{2}$ in.	37
5 and 6 in.	34
7 to 13 in.	34

Locomotive and steamship special charcoal grades bring higher prices.

1  $\frac{3}{4}$  in., over 18 ft., and not exceeding 22 ft., 10 per cent net extra.

2 in. and larger, over 22 ft., 10 per cent net extra.

**Sheets.**—Makers' prices for mill shipments on sheets of United States standard gage, in carload and larger lots, are as follows, 30 days net, or 2 per cent discount in 10 days:

Blue Annealed Sheets	Cents per lb.
Nos. 3 to 8	5.00 to 5.25
Nos. 9 to 12	4.75 to 5.00
Nos. 13 to 16	4.50 to 4.75
Nos. 17 and lighter gages are based on \$4.75 per 100 lb. for No. 28 Bessemer black sheets.	

Box Annealed Sheets, Cold Rolled	Cents per lb.
Nos. 17 to 21	4.80 to 5.30
Nos. 22 and 24	4.85 to 5.35
Nos. 25 and 26	4.90 to 5.40
No. 27	4.95 to 5.45
No. 28	5.00 to 5.50
No. 29	5.05 to 5.55
No. 30	5.15 to 5.65

Galvanized Sheets of Black Sheet Gage	Cents per lb.
Nos. 10 and 11	6.00 to 6.25
Nos. 12 to 14	6.10 to 6.35
Nos. 15 and 16	6.35 to 6.60
Nos. 17 to 21	6.40 to 6.65
Nos. 22 and 24	6.55 to 6.85
Nos. 25 and 26	6.70 to 6.95
No. 27	6.75 to 7.00
No. 28	7.00 to 7.25
No. 29	7.15 to 7.40
No. 30	7.30 to 7.55

Tin-Mill Black Plate	Cents per lb.
Nos. 15 and 16	4.55 to 4.80
Nos. 17 to 21	4.60 to 4.85
Nos. 22 to 24	4.65 to 4.90
Nos. 25 to 27	4.70 to 4.95
No. 28	4.75 to 5.00
No. 29	4.80 to 5.05
No. 30	4.85 to 5.10
Nos. 30 $\frac{1}{2}$ and 31	4.85 to 5.10

## Metal Markets

### The Week's Prices

	Cents Per Pound for Early Delivery							
	Copper, New York		Tin, Electrolytic	Lead, New York		Spelter, New York		St. Louis
Mar 14	36.00	36.00	53.00	9.50	9.50	10.75	10.50	
15	36.00	36.00	53.50	9.50	9.50	10.75	10.50	
16	36.00	36.00	53.50	9.50	9.50	10.75	10.50	
17	36.00	36.00	54.50	9.50	9.50	10.62½	10.37½	
18	36.00	36.00	54.50	9.50	9.50	10.62½	10.37½	
19	36.00	36.00	56.00	9.50	9.37½	10.62½	10.37½	
20	36.00	36.00	56.00	9.50	9.37½	10.62½	10.37½	

NEW YORK, March 21, 1917.

Copper is dull and unchanged. Tin is strong and higher. Lead is steady with an easier tendency. Spelter is exceedingly dull and a little lower. Antimony is strong and higher, but nominal.

### New York

**Copper.**—The entire market is dead, with little business being transacted. About a week ago the tendency appeared to be a little softer, but it is now stronger. The strength, however, is more in tone than in price, and the situation lacks life and snap. The strike at the Laurel Hill refinery of the Nichols Copper Company is still unsettled. This situation, with strikes at some other small refineries, has delayed considerably February shipments. This delay is likely to extend to March shipments, and it is not improbable that some consumers may have to come into the market direct. An interesting announcement yesterday was that leading producers had agreed to sell the Government the copper needed for the army and navy during the coming year at 16.6739c. The amount to be delivered is over 45,000,000 lb., of which 20,000,000 lb. is for the navy and 25,510,000 lb. for the army, deliveries to be approximately in equal quantities each quarter from April, 1917, to April, 1918. This is nearly 20c. below the present market price. The quotation on both spot electrolytic and Lake is unchanged at 36c. to 36.25c., with April quoted at 35c. to 35.50c., and May and June at 34c. to 35c. The third quarter quotation is about 31c. to 31.50c., with the last quarter at 30c. to 31c. The quotation for spot electrolytic in the London market is unchanged at £151. Reports of copper exports are no longer published, at the command of the Government.

**Tin.**—The market has proceeded from one of dullness a week ago to one of marked strength yesterday. On March 14 dullness prevailed, with offers of futures from the East, but no buyers. There was more activity on March 15, sales for the day aggregating about 200 tons. Most of this was for spot delivery, and was sold at 53.50c., although the spot price was ragged, some sales having been made at 52.87½c. and 53c. For shipments afloat, 53c. was bid, with early metal from London quoted at 53.25c. On March 16 the market was quiet, and sales were small. Future shipments from the East were 47.25c., and spot Banca was offered at 52.50c. and tin ex-steamer at 53.25c. On Saturday a little business was done in futures, probably 100 tons being sold. Yesterday and Monday the market was slow but strong, and about 100 tons were sold on Monday and a smaller quantity on Tuesday. The reason for the decidedly stronger market is a puzzle to most dealers, and their answers are more or less of a guess. The speculative reasons offered are that either a tin-laden ship has been sunk, and the information not made public, or that an income tax on exports of tin from the Straits has been decided upon. Under these conditions, buyers and sellers are assuming a waiting attitude. The effect of these unknown conditions is illustrated by the London market, where quotations for spot Straits tin were reported yesterday at £214 2s. 6d., against £201 a week ago, with about the same spread in spot standard. The arrivals for the week have been 1585 tons, and the quantity afloat is 3791 tons.

**Lead.**—The quotation for prompt and March metal is 9.50c., with 9.25c. asked for April, and 9c. for second quarter. The large arrivals from the West the past week, which have been the feature of the market, have

practically stopped the demand for spot metal, which was quoted at 10c. a week ago. Nearly all buyers have shared in the large arrivals. Some of them have been able to offer some for sale, and these offerings have caused an easier tendency. Prompt shipment from the West is also more freely offered. Late last week the threatened railroad strike caused general hesitancy, but the elimination of this source of anxiety, it is believed, will result ultimately in lower prices. The quotation of the American Smelting & Refining Company is 9c.

**Spelter.**—With galvanizers and brass makers practically out of the market, the situation is a drawn one. Producers are maintaining their position as firmly as possible and buyers are waiting because they are well covered or do not need the metal. With the ore still high so that smelting profits are small, the tendency is toward a dull market until this situation changes. There is no demand and the volume of business is very small. Bids yesterday for spot were 10.50c., St. Louis, or 10.75c., New York. April stands at 10c. to 10.25c. with second quarter at 9.50c. to 9.75c., both St. Louis. Export figures are no longer obtainable as the Government has prohibited any announcements until further notice. While the market is not really weak it is inactive.

**Antimony.**—The spot market for Chinese and Japanese grades is higher at 32c. to 33c., nominal. While perhaps small lots can be obtained here and there at these prices, large quantities are reported unobtainable at as high as 33c. bid. Shipments from the Pacific coast are still held up and hard to get, which accounts for the stiffer market. Little interest is shown in futures. March Oriental shipments are held at about 15c. and April shipments at 14.25c.

**Aluminum.**—There is little interest in the market, the nominal quotation standing unchanged at 58c. to 60c. for No. 1 virgin aluminum, 98 to 99 per cent pure.

**Old Metals.**—The market is a little easier. Dealers' selling prices are as follows:

	Cents per lb.
Copper, heavy and crucible	33.00 to 33.50
Copper, heavy and wire	32.00 to 32.50
Copper, light and bottoms	27.00 to 27.50
Brass, heavy	20.00 to 20.50
Brass, light	15.75 to 16.00
Heavy machine composition	26.25 to 26.75
No. 1 yellow rod brass turnings	20.50 to 21.00
No. 1 red brass or composition turnings	23.00 to 24.00
Lead, heavy	8.875
Lead, tea	8.375
Zinc	9.00

### Chicago

MARCH 20.—Some adjustment of the nominal values which have been prevailing, particularly for copper and lead, is apparent in the slightly lower quotations for these metals in the last few days. The sold-up condition of most of the producers continues to make difficult the placing of orders for prompt delivery. We quote: Casting copper, 34.25c. to 34.50c.; Lake copper, 36c.; tin, carloads, 53.50c., and small lots, 56c.; lead, 9.50c.; spelter, 10.75c.; sheet zinc, 21c.; Cookson's antimony, 50c.; other grades, 35c. to 36c. On old metals we quote buying prices for less than carload lots as follows: Copper wire, crucible shapes, 28c.; copper bottoms, 24.50c.; copper clips, 27c.; red brass, 24c.; yellow brass, 17.50c.; lead pipe, 8c.; zinc, 8c.; pewter, No. 1, 32c.; tinfoil, 40c.; block tin pipe, 45c.

### St. Louis

MARCH 19.—Non-ferrous metals have been somewhat irregular during the week, but closed firm to-day with lead in carload lots at 9.25c. to 9.50c. and spelter 10.50c. to 10.75c. In less than carload lots the quotations are: Lead, 10.50c.; spelter, 12c.; tin, 58c.; Lake copper, 36c.; electrolytic copper, 35.50c. to 36c.; Asiatic antimony, 35c. In the Joplin district zinc blende sold at \$75 to \$90 per ton, with the average for the week \$82; calamine, \$45 to \$55, with the average for the week \$50; lead ore, up to \$122.50, with the average for the week \$118. On miscellaneous scrap metals we quote dealers' buying prices as follows: Light brass, 12.50c.; heavy yellow brass, 13.50c.; heavy red brass and light copper, 19.50c.; heavy copper and copper wire, 23c.; zinc, 7c.; lead, 5.50c.; tea lead, 3.50c.; tinfoil, 36c.; pewter, 25c.

## PERSONAL

Col. J. C. Maben, long president of the Sloss-Sheffield Steel & Iron Company, Birmingham, Ala., has resigned and has been made chairman of the board. He will be succeeded temporarily by James N. Wallace, president Central Trust Company, New York, but it is expected that later a man actively engaged in the manufacture of iron will be elected. Colonel Maben will reside in New York at the Waldorf-Astoria.

C. B. Cushwa will be general superintendent of the plant of the Youngstown Iron & Steel Company, Youngstown, Ohio, recently taken over by the Sharon Steel Hoop Company, Sharon, Pa. Formal announcement to this effect has been made by President Severn P. Ker.

John M. Kerr, formerly in the sales department of the Brier Hill Steel Company, Youngstown, has been appointed sales manager of the Mahoning Valley Steel Company, now erecting sheet mills at Niles, Ohio, and of which Jacob D. Waddell is president.

P. P. Reese has tendered his resignation as superintendent of the steel plant of the Timken Roller Bearing Company, Canton, Ohio, effective April 1, to become works manager of the Superior Steel Company, Carnegie, Pa. He will be succeeded in Canton by F. C. Pritz, metallurgist of the South Chicago works of the Illinois Steel Company.

M. B. Myers, formerly assistant to the vice-president of the American Manganese Steel Company, has been appointed to the office of sales manager.

F. F. Beall, vice-president Packard Motor Car Company, addresses the Steel Treating Research Club of Detroit, Friday evening, March 23, on "The Requirements of Metallurgical Results in Manufacturing."

Prof. W. D. Bancroft, Cornell University, has been selected by the board of directors of the American Electrochemical Society to represent electrochemistry on the Chemistry Committee of the National Research Council.

John E. Perry, assistant to President T. J. Bray, of the Republic Iron & Steel Company, Youngstown, Ohio, whose duties were looking after ore and coal mining operations, has resigned, effective April 1, to go with the Brier Hill Steel Company, and will have charge of its mining and transportation departments.

Walter A. Davis, of the home sales department of the Youngstown Sheet & Tube Company, has been transferred to the offices of the company in New York City. He has been specializing in rods, wire and pipe.

Johnson Morgan, who has been with the Remington Arms-Union Metallic Cartridge Company for the past 13 years, and who acted as purchasing agent of the Remington Arms Company of Delaware during the period of the construction and development of its works at Eddystone, Pa., in 1915 and 1916, has severed his connection with the Remington organization to engage in the banking business. On April 1 he will become associated with the National Mohawk Valley Bank, Mohawk, N. Y.

Emile Joseph Bayle, assistant to the president of the Pfaudler Company, Rochester, N. Y., gave an address before the Rochester Engineering Society on March 2 on "Profit-Making Management."

F. A. Botts, of the Louisville office of Hickman, Williams & Co., pig-iron and coke merchants, has been transferred to their Cincinnati office.

Reports that H. H. Stewart had been appointed assistant comptroller of the Pittsburgh Crucible Steel Company, with headquarters in Pittsburgh, are incorrect. He continues as assistant auditor of the Crucible Steel Company of America, and also auditor of the Pittsburgh Crucible Steel Company of Midland, Pa., its identified interest.

C. H. Rose, for five years auditor of the Brier Hill Steel Company, Youngstown, Ohio, has been appointed secretary to W. A. Thomas, president.

G. M. Meyncke has issued an announcement of an unusual character relative to his appointment as representative of the Hyatt Roller Bearing Company at Cincinnati. The announcement will undoubtedly command attention. He has had considerable experience in machine design as well as in the selling field. His address is Box 520, Cincinnati.

C. S. Bilyeu, formerly connected with Hildreth & Co., engineers, New York City, has recently become associated with the Gulick-Henderson organization of inspecting engineers, and will be located in its general office in New York City.

## Iron and Industrial Stocks

NEW YORK, March 21, 1917.

Great strength has been imparted to the market for stocks by the settlement of the railroad strike. This appears to be regarded as a much greater financial influence than the war cloud which now hangs over our relations with Germany. Sharp advances have taken place in practically all the iron and steel stocks and those of car equipment companies. The range of prices on active iron and industrial stocks from Wednesday of last week to Tuesday of this week was as follows:

Allis-Chal., com., 26 1/4 - 30	Int. Har. Corp., com., 77 1/4 - 81
Allis-Chal., pref., 85 1/2 - 86 1/2	La Belle Iron, com., 83 - 87 1/2
Am. British, com., 9	La Belle Iron, pref., 126 1/2
Am. Can., com., 45 - 48 1/2	Lacka. Steel, 81 - 86 1/2
Am. Can., pref., 106 1/4 - 108	Lake Sup. Corp., 21 1/2 - 23 1/2
Am. Car & Fdry., com., 65 - 69 1/2	Lima Loco., 57 1/2 - 58
Am. Car & Fdry., pref., 115 3/4	Lukens, com., 41 - 42 1/2
Am. Loco., com., 70 - 74 1/2	Lukens, 1st pref., 100
Am. Loco., pref., 105 1/2 - 106	Midvale Steel, 56 1/2 - 61 1/2
Am. Rad., com., 290 - 300	Nat.-Acme, 34 - 35
Am. Rad., pref., 134 - 135	Nat. En. & Stm., com., 33 1/2 - 35 1/2
Am. Ship., com., 65 1/4 - 70 1/4	Nat. En. & Stm., pref., 98
Am. Steel Fdries., 61 1/4 - 64 1/4	N. Y. Air Brake, 149 - 153 1/2
Bald. Loco., com., 52 1/2 - 57 1/2	Pitts. Steel, pref., 100 - 100 1/2
Bald. Loco., pref., 100 1/2 - 102	Pressed Stl., com., 77 - 80 1/2
Beth. Steel, com., 131 - 146	Pressed Stl., pref., 103 1/2 - 104 1/2
Beth. Steel, class B, 113 1/2 - 139 1/2	Ry. Steel Spring, com., 51 1/4 - 52 1/2
Cambria Steel, 105	Ry. Steel Spring, pref., 99 - 99 1/2
Carbon Stl., com., 90 - 95	Republic, com., 78 1/2 - 85 1/2
Case (J. I.), pref., 81 1/2 - 88	Republic, pref., 103 1/2 - 104 1/2
Chic. Pneu. Tool, 68 - 69 1/2	Sloss, com., 63 1/2 - 74
Colo. Fuel, 47 - 53 1/2	Sloss, pref., 98
Cruc. Steel, com., 65 - 71 1/2	Superior Steel, 1st pref., 98 1/2
Cruc. Steel, pref., 110 - 111 1/2	Transue-Williams, 44 - 46 1/2
Deere & Co., pref., 98	Un. Alloy Steel, 45 - 46 1/2
Driggs-Seabury, 55 - 61	U. S. Pipe, com., 19 - 21 1/2
Gen. Electric, 163 1/2 - 169 1/2	U. S. Pipe, pref., 58 1/2
Gt. No. Ore Cert., 33 3/4 - 37 1/4	U. S. Steel, com., 110 - 117
Gulf States Steel, 120 - 132 1/2	U. S. Steel, pref., 117 1/2 - 118 1/2
Gulf States Steel, 1st pref., 107	Va. I. C. & Coke, 58 - 67
Harb.-Walk. Refrac., com., 130	Warwick, 9 1/2
Int. Har. of N. J., com., 116 - 119 1/2	Westing. Elec., 50 1/2 - 54 1/2
Int. Har. of N. J., pref., 119 1/2	

## Dividends

The American Brake Shoe & Foundry Company, regular quarterly, 1 1/4 per cent on the common and 2 per cent on the preferred, payable March 31.

The American Locomotive Company, regular quarterly, 1 1/4 per cent on the common, payable April 3, and 1 1/4 per cent on the preferred, payable April 21.

The E. W. Bliss Company, regular quarterly, 1 1/4 per cent and extra 1 1/4 per cent on the common and regular quarterly, 2 per cent on the preferred, payable April 2.

The Cleveland-Cliffs Iron Company, regular quarterly, 2 1/2 per cent, payable April 25.

The Colt's Patent Fire Arms Mfg. Company, regular quarterly, 4 per cent and extra 20 per cent, payable March 31.

The Otis Elevator Company, regular quarterly, 1 1/4 per cent on the common and 1 1/2 per cent on the preferred, payable April 16.

The Sloss-Sheffield Steel & Iron Company, regular quarterly, 1 1/2 per cent on the preferred, payable April 2.

The Standard Screw Company, extra 50 per cent on the common, payable March 20.

The Todd Shipyards Corporation, regular quarterly on the preferred, \$1.75 per share, payable March 20.

The Torrington Company, regular quarterly, 75 cents per share on the common and 25 cents per share extra, payable April 2.

The Washburn Wire Company, regular quarterly, 2 per cent on the common and 1 1/4 per cent on the preferred, payable April 2.

The Westinghouse Air Brake Company, regular quarterly, \$1.75 per share, payable April 21.

The Crucible Steel Company of America, 2 per cent on the preferred stock on account of back dividends, payable April 28.

## Pittsburgh and Nearby Districts

The Pennsylvania Engineering Works, New Castle, Pa., has taken some large orders for blast-furnace and steel-works equipment. Among these are one 1300-ton metal mixer, two 25-ton converters and one 200-ton rolling open-hearth furnace, for the Tata Iron & Steel Company, Sakchi, India. Others call for five 25-ton converters and two 1300-ton metal mixers for the Bethlehem Steel Company, South Bethlehem, Pa., one 1300-ton metal mixer for the Cambria Steel Company, Johnstown, Pa., one 1300-ton metal mixer for the Jones & Laughlin Steel Company, Pittsburgh, a blast furnace and open-hearth furnaces for the Mark Mfg. Company, Chicago. Most of these contracts carry with them all the accessories, such as ladles, transfer cars, jack cars, etc. This company has recently made a large extension to its foundry, in which considerable new equipment was installed, giving a much larger output of castings.

The sixth annual meeting of the Metal Branch of the National Hardware Association of the United States will be held in the William Penn Hotel, Pittsburgh, June 1 and 2. W. H. Donlevy, of Carter, Donlevy & Co., Philadelphia, is chairman, and George A. Fernley, Philadelphia, is secretary.

At a meeting of stockholders of the Westinghouse Air Brake Company, held at Wilmerding, Pa., last week, an increase in the capital stock from \$20,000,000 to \$30,000,000 was approved, the additional issue to be used in acquiring the Union Switch & Signal Company.

The Ashland Products Company, Ashland, Ohio, incorporated with a capital of \$100,000, to manufacture automobile, truck and garage jacks and flushers, will erect a two-story building, 42 x 150 ft., and is in the market for the equipment. J. W. Brindle is president; J. W. Stillwagon, vice-president; James Hess, secretary and office manager; C. L. Smith, treasurer, and L. R. Willour, superintendent.

The Westinghouse Electric & Mfg. Company, East Pittsburgh, will in a few days make final shipment on its orders for 430,000 8-in. shells to go to the Entente Allies.

The Indiana Foundry Company, Ltd., manufacturer of foundry hardware and machinery, Indiana, Pa., has moved into its new stove fitting department, a concrete steel and brick structure, 70 x 165 ft.

The Republic Iron & Steel Company has completed and put in operation at Youngstown, Ohio, another lap-weld furnace in its pipe mills. Some time ago it started a new butt-weld furnace. The company now has three lap and three butt weld furnaces making lap-weld steel pipe from 3 in. to 16 in. inclusive and butt-weld from 1/4-in. to 3-in. inclusive.

It is understood that the Union Switch & Signal Company, whose plant at Swissvale, Pittsburgh, was destroyed by fire about a month ago, has about completed plans for rebuilding. The contract for the erection of the new shops has been placed with Stone & Webster, Boston, Mass. Orders for a large part of the new equipment to go into these buildings have been placed, and in their construction the buildings will represent the latest modern ideas. They are expected to be completed late this year.

The Penn Art Steel Works, Erie, Pa., has been organized with a capital of \$125,000. The incorporators are M. J. Schabaker, E. H. Derry, and Landis E. Isaac.

Work on the by-product coke plant to be built in the Youngstown district by the Carnegie Steel Company, to furnish coke for the six blast furnaces at the Ohio works, will not likely start for some months. This decision is due to the pressure on the company for its finished products, and also because of the scarcity of skilled labor.

The Lawrenceville Bronze Company, now operating a foundry in Pittsburgh, some time ago bought the plant of the Kerner Mfg. Company at Zelienople, Pa., about 25 miles from Pittsburgh, and has recently completed the installation of modern equipment for the manufacture of heavy brass, bronze and copper castings up to 5 tons in weight. It will also remove the greater part of its equipment from its Pittsburgh

foundry to Zelienople, concentrating its entire operations there. The Zelienople plant will then have a capacity for turning out 10 to 12 tons per day. The company will continue to maintain offices in Pittsburgh, the location of which has not yet been arranged.

The offices of the MacBern Scrap Iron Company have been removed from the Second National Bank Building to rooms 1021-22 Park Building, Pittsburgh.

The offices of the Union Spring & Mfg. Company have been removed from the First National Bank Building to rooms 1206-13 Fulton Building, Pittsburgh.

The offices and meeting rooms of the Engineers' Society of Western Pennsylvania, now located on the twenty-fifth floor of the Oliver Building, will be removed about May 1 to the fifth floor of the new Frick Arcade Building.

The Valley Mold & Iron Company, Sharpsville, Pa., has decided to incorporate under the name of the Valley Mold & Iron Corporation, with a capital stock of \$2,000,000. The control and management of the company will remain in the hands of George H. Boyd and his associates, but the directorate has been increased to seven members, the new directors being John Sherwin, president First National Bank, Cleveland, Ohio; Edward R. Tinker, vice-president Chase National Bank, New York City, and Henry Lockhart, Jr., vice-president Goodrich-Lockhart Company, New York City. George H. Boyd is president; Floyd K. Smith, vice-president; Frank W. Tickner, general manager, and Edward H. Boyd, general superintendent.

No. 12 open-hearth furnace of the Brier Hill Steel Company, Youngstown, Ohio, has been completed and gives the company a total of 12 100-ton open-hearth furnaces with an annual capacity of close to 650,000 tons of ingots.

The regular monthly meeting of the Pittsburgh Foundrymen's Association was held in the Fort Pitt Hotel, Pittsburgh, on Monday evening, March 19. Barton R. Shover, consulting engineer, Diamond Bank Building, Pittsburgh, and formerly general manager of the Tata Iron & Steel Company, Sakchi, India, described iron and steel manufacturing in India.

The Fulton Iron Works, St. Louis, has begun the construction of a large forging plant. It manufactures heavy duty sugar-mill machinery, Diesel oil engines, etc.

The Pittsburgh Insulating Company, Pittsburgh, is putting on the market the Pico export lacquer. This is a transparent lacquer for the protection of iron and steel products from rust while in ocean transit.

The Rath Metal Products Company, Liberty Avenue, Pittsburgh, has changed its name to the Gloekler Foundry Company.

## Another Iroquois Blast Furnace

The Iroquois Iron Company announces its decision to build a second new furnace at South Chicago of approximately 400 tons daily capacity. This will bring the plant of the company up to six furnaces, with an aggregate daily production of about 2500 tons of pig iron. During the period of the lease of one of the stacks by the Miami Products Company for the manufacture of spiegeleisen and ferromanganese, this production is somewhat less. This will be the twelfth furnace under construction or definitely projected in the Chicago district. The National Tube Company is building four, the Indiana Steel Company four, the Mark Mfg. Company one, the Inland Steel Company one (now completed), and Iroquois Iron Company two.

## To Roll Bars from Discard Steel

The Inland Steel Company has placed in operation at its Chicago Heights mill a new electrically driven 18-in. roughing mill, installed for the purpose of breaking down so-called discard billets. It will deliver these billets from its Indiana Harbor mill to be rolled at Chicago, largely into reinforcing bars. This new equipment is a logical accommodation in the situation prevailing for some time for taking care of the large tonnage of discard steel produced, as well as making up the deficiency of rerolling rails.

## OBITUARY

### Reuben Miller

Reuben Miller, aged 78, the first president of the Crucible Steel Company of America, Pittsburgh, when it was organized in 1900, and a leader in industrial and financial circles, died at his home in that city on Wednesday morning, March 14, of pneumonia, after an illness of about two weeks. Mr. Miller was born in



REUBEN MILLER

Pittsburgh, Jan. 31, 1839, his father being a pioneer iron manufacturer in Pittsburgh and also a banker. He was educated at the College of St. James, Washington County, Md., and, to acquire a practical knowledge of mechanics, followed his college course by becoming an apprentice in the works of Robinson, Minus & Miller, furnace builders, and later was mechanical engineer at the Black Diamond steel works of Park Bro. & Co., Ltd., Pittsburgh, and designed and built some of its bar and sheet mills. In 1885, Mr. Miller and others formed the partnership of Miller, Barr & Parkin, this company afterward becoming the firm of Miller, Metcalf & Parkin, which later was merged into the Crescent Steel Company. In 1900 the Crescent Steel Company became a subsidiary of the Crucible Steel Company of America. Mr. Miller was made chairman of the board of directors of the Crucible Company, retaining that position until he retired from active business in 1904.

Mr. Miller organized, and for years was treasurer of, the Pittsburgh Bessemer Steel Company at Homestead, which was subsequently sold to Andrew Carnegie and associates, and is now the Homestead steel works of the Carnegie Steel Company. He also was interested in locomotive building, having organized the Pittsburgh Locomotive Works, of which he became vice-president. Early in life he was an active figure in the oil business, having been one of the pioneers in developing property near Oil City, Pa. Later he engaged in oil refining and was one of the owners of the Petroleum Refinery in Pittsburgh. He disposed of his oil interests to enter the mining and civil engineering fields and soon had made a reputation as a mining engineer. He operated the Pioneer Coal Company successfully for many years. He was a prominent figure in the banking circles of Pittsburgh. He served with distinction throughout the war in Knapp's Pennsylvania Volunteer Battery and for gallantry was made lieutenant in the organization, of which he was one of the two last survivors.

HENDERSON WEIR, secretary Harlan & Hollingsworth Corporation, Wilmington, Del., died suddenly March 4. He had been connected with the company for about 21

years, during the major part of which period he acted as manager of the car department, particularly looking after the sales end of the business. In the latter capacity he will be succeeded by Frank N. Grigg, of Richmond, Va., who for several years has been representing the company in connection with the Southern trade. William T. Thompson, superintendent of the car department under Mr. Weir's management, will be manager of the car department.

### Charles A. Vogt

Charles A. Vogt, auditor of the American Steel & Wire Company, died at his home in Cleveland March 15, of pneumonia, after an illness of a few days. Few men in the steel industry have carried great responsibilities so early in their career, Mr. Vogt being but 24 when he was promoted to the auditorship of the important wire unit of the United States Steel Corporation. He attended the Chicago public schools through the grammar grades and in the next few years took higher school studies and business branches at night school.

Mr. Vogt entered the employ of the Illinois Steel Company as an office boy in 1891, when 15 years old. He served under W. A. Green, then secretary of that company, being promoted later to the position of chief clerk. In 1899, when the American Steel & Wire Company was formed, he was appointed assistant auditor of the consolidation, and in 1901, soon after it became a part of the United States Steel Corporation, he was made auditor, and at that time removed from Chicago to Cleveland. In 1913, on the death of F. H. Daniels, Worcester, Mass., he was chosen a director of the company.

The consolidation period in the steel trade developed many new problems, particularly since the Government's activities in corporation affairs have been more marked, and the burdens of auditing departments have been vastly increased. To the solution of these problems Mr. Vogt and his contemporaries have made no small contribution.

Mr. Vogt leaves his widow, daughter of A. I. Findley, and an infant son. His brother, A. W. Vogt of



CHARLES A. VOGT

New York, is assistant comptroller of the United States Steel Corporation. The funeral at Cleveland on March 18 was attended by all the officers of the American Steel & Wire Company and by a large number of other representatives of the company from Cleveland, Chicago, Pittsburgh, Worcester and New York. The interment was at Chicago.

JOHN M. STUDEBAKER, SR., honorary president of the Studebaker Corporation, South Bend, Ind., died at his home in that city, March 16, aged 83 years. He was born near Gettysburg, Pa., was the son of a blacksmith and wagon maker and one of 13 children. The family moved to Ashland, Ohio, and then to South Bend. He picked up the rudiments of his father's trade, and in 1853, when 20 years old, gave, as part pay for the privilege of accompanying an expedition across the continent to California, the first wagon he ever built, and drove it to the coast. Instead of digging for gold, he accepted the job of wheelbarrow and wagon maker for a blacksmith at Hangtown, Cal. By 1858 he had saved \$3,000, when he returned to South Bend, where he bought his brother Henry's half interest in a wagon shop, in which his brother Clem held the other half. The firm name was changed to C. & J. M. Studebaker and in 1862, when two other brothers were taken into the firm, the name became the Studebaker Bros. Mfg. Company. In the wagon industry the name Studebaker became famous and the factory grew to be the largest of its kind in the world. One by one the brothers passed away and the subject of this sketch was the last to linger. The decline of the horse-drawn vehicle caused the company to become one of the largest producers of power vehicles as well as of wagons and carriages in the country. It is said that Mr. Studebaker was much depressed at having to change conditions in his plant, regarding it as a surrender of individuality, but the possibilities of the new field soon inspired him and, though he was beyond the years when men usually seek retirement, he rose to the occasion, was an active factor in the reorganization and was as enthusiastic over the rapid growth of business as the younger men with whom he was associated. But the change finally resulted in diverting the control from the family hands. When the Studebaker Corporation was organized, with the financing by Eastern capital, Mr. Studebaker was made honorary president, in recognition of his well-preserved ability as a business man and the active part he had played in the building up of the original enterprise. He leaves two daughters and one son, J. M. Studebaker, Jr.

HENRY ROBERTS, a pioneer wire manufacturer and inventor, died March 18, at Monaca, Pa., aged 86 years. He was born in Liverpool, England, and on coming to this country went to work in a wire mill at Belleville, N. J., where he drew the smallest gage wire that had been made here up to that time. In 1858 he started in the wire business in New York. During the Civil War he had a wire mill in Bloomfield, N. J., which was burned in 1865. He then started in business at Newark, N. J., where he continued until 1877, when he combined forces with Dr. and Dudley Gautier of New York, establishing the Gautier Steel Company in Johnstown, Pa. In 1880 Mr. Roberts left Johnstown to join the Oliver Brothers in Pittsburgh, where he built the Oliver & Roberts Wire Company's wire and rod mills. When the plant was destroyed by fire he rebuilt it in three months, working day and night. To complete such a task in that time was considered beyond human skill, and his feat was praised by manufacturers throughout the United States and Europe. When the Oliver & Roberts Wire Company bought out the Hainsworth Steel Company, Mr. Roberts took charge of that plant in connection with others. He was an inventor of many devices to reduce the cost of manufacture and lessen accidents. Many of the devices now in use are his inventions. He retired from business in 1891. He leaves two sons and one daughter.

FERDINAND W. ROEBLING, treasurer and general manager of the John A. Roebling's Sons Company, builder of the Brooklyn Bridge and other large structures, died at his home, in Trenton, N. J., March 16, aged 75 years. He was born in Saxonburg, Pa., and was one of the four sons of John A. Roebling, who was the pioneer in the manufacture of wire rope in this country, establishing his plant in Saxonburg in 1840 and in 1848 transferring the works to Trenton. Upon the death of the senior Roebling, Ferdinand took over the executive management of the concern, leaving the technical work to his brothers, and was largely responsible for its great ex-

pansion. He was a man of scholarly attainments, an accomplished musician and linguist and a patron of art. He was a graduate of the Polytechnic College, Philadelphia, where he specialized in chemistry. He leaves his widow, two sons and two daughters.

DANIEL WHEELER BOWMAN, consulting engineer for the Phoenix Iron Company, Phoenixville, Pa., died March 13, aged 73 years. He was born in New Bedford, Mass., and was a graduate of Cornell University in one of the first classes to graduate from that institution in civil engineering. His first work was with Capt. James B. Eads at the mouth of the Mississippi, directly under Elmer L. Corthell, late president of the American Society of Civil Engineers. Mr. Bowman became connected with Clark, Reeves & Co., now the Phoenix Bridge Company, in 1876, resigning in 1885 to inspect bridges for the Southern Railway Company. For a short time he was connected with the Boston Bridge Works, but in 1894 returned to Phoenixville, resigning in 1896 to enter the structural fabricating business in Chicago. Again he returned to the Phoenix Iron Company in 1898, succeeding H. H. Quimby in 1900 as chief engineer. In 1914 Mr. Bowman resigned his work as chief engineer and was made consulting engineer.

GEORGE HENRY FROST, founder and for many years publisher of *Engineering News*, died March 15 at his home in Plainfield, N. J., aged 79 years. He was born in West Hawkesbury, Ontario, Canada, and was graduated from McGill University as a civil engineer in 1860. His civil engineering experiences covered surveying work in Wisconsin for the Chicago & Northwestern Railroad. In April, 1874, he brought out the first number of the *American Architect and Surveyor*, a monthly sheet, which in 1876 he made a weekly and renamed *Engineering News*. This in 1911 he sold to the Hill Publishing Company, and a few weeks ago it was merged with the *Engineering Record*. He was president of the *Courier News* of Plainfield, which he bought in 1904. He was a member of American and Canadian societies of civil engineers. He served in the City Council of Plainfield and at the time had charge of the installation of that city's sewerage system.

#### Dayton Furnace Property Sold

The Dayton Coal & Iron Company, Dayton, Tenn., has been sold to Francis C. Carey and associates of Minneapolis, Minn., subject to the formal confirmation of the bankruptcy court. The buyers will pay \$400,000 for the plant and properties, not including pig iron and coal stocks, making an initial payment of \$50,000 and \$70,000 annually thereafter. The Dayton Coal & Iron Company was adjudged a bankrupt in December, 1915, following the failure of James Watson & Co., Glasgow, Scotland, in June, 1913, generally attributed to an attempt to corner the market in Middlesbrough warrants. The Tennessee concern has two blast furnaces at Dayton which were last active in 1913. The annual capacity is 100,000 tons and the products of past years were foundry and forge grades.

#### Imports of Ferromanganese in February

Imports of ferromanganese into the United States in February, according to Government data furnished THE IRON AGE, were 6379 gross tons. They were received as follows: 3227 tons through Philadelphia, 1849 tons through Baltimore, 732 tons through New Orleans, and 571 tons through Newport News. The February imports compare with 6211 tons in January and an average of 6570 tons per month in 1916.

American foreign trade decreased from January approximately \$190,000,000 in February, the first month of Germany's unrestricted submarine warfare. The Department of Commerce gives the decrease in exports as \$147,032,659, and the decrease in imports \$42,239,685. The excess of exports over imports in February was \$266,946,437.

# Machinery Markets and News of the Works

## A STRONG MARKET

### Trade Good Despite War and Rail Crises

#### Newport News Ship Plant Buys Heavily— Several Railroad Lists Out—Crane Builders Are Doing a Big Business

The market holds strong at all important centers, despite a general lack of sizable orders. This is noteworthy, when it is realized that either the war crisis or the railroad strike threat would ordinarily put an abrupt stop to the placing of orders. Railroad congestion is still seriously hindering deliveries, particularly at Cincinnati, where some machine-tool builders have crowded their warehouses so full that it is hard to get many shipments out when wanted.

Several machine-tool lists issued by the railroads in the past few days are in striking contrast to the replacement orders which have now characterized buying for weeks. None of the lists are large; but their simultaneous appearance gives them considerable weight in the market. In New York the Long Island Railroad is buying about 20 tools, and the Delaware & Hudson Company 30 machines. At Cleveland the Nickel Plate road has put out specifications for about 30 more. Several other Eastern railroads are buying equipment for terminal shops.

Some shipbuilding plants are buying heavily. The Newport News Shipbuilding & Dry Dock Company, Norfolk, Va., which is making improvements to cost \$2,500,000, is purchasing several hundred thousand dollars worth of machine tools. The Globe Shipbuilding Company, Superior, Wis., is seeking similar equipment. Other plants are also buying. A strike of shipbuilders at San Francisco will likely cause a letup in machinery demand from this source, unless an early settlement is effected.

Manufacturers of cranes and hoisting machinery are doing a large business. Fuel famines and soaring coal prices have induced a great many industries not so equipped to install coal-handling apparatus. Railroad terminals, public service and other power plants are likewise putting in such facilities. The continued shortage of cheap or competent labor has made it a necessity for many companies to do so. The Government also has some big requirements in this line pending.

Export business as a whole remains for the present a market factor of minor consequence.

## New York

NEW YORK, N. Y., March 21, 1917.

Some of the Eastern railroads now have lists before the trade. While, as railroad requirements usually go, they are not of first importance, the present buying from this source is of such minor consequence that the appearance of these lists is creating considerable interest. The Long Island Railroad is in the market for about 20 tools for its Richmond Hill shops and is likely to close for them this month. The Delaware & Hudson Company will shortly place orders for about 30 machines, including planers, turret lathes, shaping machines, grinding machines and other similar units for its Colonie shops. In connection with the erection of its new

terminal facilities at East Salamanca, N. Y., the Buffalo, Rochester & Pittsburgh Railway has just taken bids on two 100-ton, two 15-ton, three 10-ton and one 7½-ton traveling cranes. The Lehigh Valley and the Boston & Albany have bought a few tools and the Union Pacific is still in the market.

Cranes and other hoisting and conveying machinery are showing more life than of late, and are perhaps more active than some of the machine-tool lines. Fuel famines and mounting coal prices have been instrumental in inducing industrial companies and public service power plants everywhere to put in coal-handling apparatus. The Midvale Steel & Ordnance Company, Philadelphia, is in the market for a 150-ton ladle crane for its Worth Brothers plant and has placed contract for 50-ton and 10-ton overhead electric traveling cranes for its Nicetown works. The Consolidated Gas, Electric Light & Power Company, Baltimore, will purchase a 15-ton 85-ft. span crane for its new gas-generating plant. The Utica Gas & Electric Company, Utica, N. Y., is closing for a 50-ton crane and power equipment. The Utah Copper Company has also ordered a 50-ton unit for Western delivery. The Reading Steel Casting Company, Reading, Pa., has ordered a 10-ton 60-ft. span overhead crane for its foundry. Gould & Eberhardt, Newark, N. J., have purchased five overhead cranes. The Reading Iron Company, Reading, Pa., has bought a 10-ton overhead crane for pipe-handling work. Many manufacturers have put in locomotive cranes for handling fuel, with a view to disposing quickly of the installation when present abnormal conditions shall have subsided. Inquiry for this class of equipment is strong from all over the country. One of the largest crane manufacturers reports having taken over \$150,000 worth of business in one week recently and another smaller company booked about \$65,000 worth in the first two weeks of March. The Navy Department, Washington, is receiving proposals for about \$100,000 worth of cranes for the navy yards at Philadelphia and Washington, D. C. Export inquiry amounts to little and orders are noticeably lacking. J. P. Morgan & Co., who have taken bids generally through the trade for 10 electric overhead cranes, have withdrawn from the market on the ground that lower quotations and quicker deliveries are to be had in England. Conditions with some crane builders are so crowded that salesmen are at times told to make no concessions on specifications calling for special construction. Deliveries remain about six months off.

Some heavy buying of machine tools is being done by the Newport News Shipbuilding & Dry Dock Company, Newport News, Va. The requisition covers a complete machine-shop equipment and will cost several hundred thousand dollars. The Globe Shipbuilding Company, Superior, Wis., is in the market, its requirements including rolls, punches, shears, countersinking machines. It is willing to take used tools if in good condition, in order to get them at the earliest possible moment. It is expected that the new policy of the Navy Department which has been initiated by the recent awards for the construction of battleships on a cost basis will keep shipbuilding plants in the van of buying for some time to come.

The D. Nast Machinery Company, Bourse Building, Philadelphia, is in the market for the following equipment for a brass and copper rolling mill:

- One 22-in. x 36-in. single breaking down mill with two-speed drive and arranged if possible for changing to double mill later on.
- One 20-in. x 28-in. double running down mill with one-speed drive and collar.
- One 16-in. x 30-in. double finishing mill with one-speed drive, two collars and two blockers.
- Two 12-in. x 18-in. single finishing mills.
- One heavy splitter with scrap cutter.
- One five-roll heavy straightener.
- One nine-roll light straightener.
- Several sizes of alligator shears.

Dealers are doing a very good business on all lines of machinery. The market holds about the same level as of recent weeks, the aggregate of sales varying a bit with each house, but the entire trade reports a good flow of inquiry and orders, almost entirely for single tools and small lots.

Foreign orders and inquiry are coming in steadily, more particularly with those manufacturers who have quoted almost entirely f. o. b. factory and have left the worries of transportation to the consignee.

Manufacturers of valves and of tools, such as broaching machines, in New England are very busy.

John D. Thiesmeyer, Jr., 114 Liberty Street, New York.

is inquiring for a 16-ft. two-head boring mill of recent type in good condition.

R. A. Pinner, 122 Water Street, New York, will purchase 26-in. to 64-in. planing machines and 36-in. to 120-in. boring machines.

The Sheppard Electric Crane & Hoist Company, Montour Falls, N. Y., has purchased a 20-in. punch, a double-angle shear and a single horizontal bending and straightening machine for the addition to its bridge shop. It is planning to increase its pattern-making equipment.

The Atlas Steel Casting Company, manufacturer of acid open-hearth castings, 1963 Elmwood Avenue, Buffalo, N. Y., recently increased its capital stock from \$150,000 to \$400,000 to meet expenditures made for the recent additions to its plant. No further enlargement of manufacturing facilities are contemplated now. George H. Chisholm is president and E. C. Strong is vice-president and general manager.

The Sowers Mfg. Company, manufacturer of soap-making machinery, steam-jacketed kettles, etc., Buffalo, N. Y., has had plans drawn for a machine-shop addition to cost about \$4,000. Colson & Hudson, 31 Dun Building, Buffalo, are the architects. The equipment for this added floor space has been ordered.

The Rubber Waste Company will be located temporarily at 247 East 137th Street, New York, pending the completion of its new office and warehouse at Lincoln Avenue and 135th Street.

The Linde Air Products Company, Forty-second Street Building, New York, has awarded contracts and started the erection of a plant at Brittain and Jones streets, Youngstown, Ohio, for the production of commercial oxygen.

The De Haven Mfg. Company, manufacturer of box straps, cold-rolled steel hoops, wire specialties, etc., 50 Columbia Heights, Brooklyn, N. Y., reports one of its four-story buildings, a structure 30 x 85 ft., partially destroyed by fire March 12, with a total damage of about \$20,000. Philip J. Forbes is secretary and treasurer.

The W. W. Babcock Company, Bath, N. Y., manufactures spruce ladders, trestles, staging, etc., not butter churns, as has been stated.

The Pyramid Grate Bar Company, Yonkers, N. Y., has plans prepared for a foundry, 50 x 100 ft., one story. George W. Elder, Jr., 30 East 42nd Street, New York, is president.

Contract for a three-story manufacturing building has been let by the Mica Insulator Company, Schenectady, N. Y.

The Bronze-Alumina Corporation, Tonawanda, N. Y., has filed incorporation papers, with a capital stock of \$16,000, to manufacture aluminum, silicon, bronze and iron castings. F. A. Redner, J. E. Kaufmann and J. A. Willing, 141 Masten Street, Buffalo, are the directors.

The Certain-teed Products Corporation, Niagara Falls, N. Y., H. B. Allen, general manager, has purchased and remodeled the plant of the Lockport Paper Company on Elizabeth Street and will build a new factory and warehouse adjoining, to cost \$200,000. About 300 workmen will be employed.

The Allegretti Mfg. Company, Geneva, N. Y., manufacturer of razor straps, etc., has let contract for a factory, 56 x 58 ft., two stories and basement, to cost \$15,000.

The Empire Auto Trailer Company, Buffalo, N. Y., has been incorporated with a capital stock of \$50,000, to manufacture motors, vehicles, machines and accessories. C. B. Howell, Frederick Tucker and Joseph Kazubowski are the incorporators.

The Pierce-Arrow Motor Company, Buffalo, has let contract to the Turner Construction Company, 11 Broadway, New York, for erection of a four-story factory, 60 x 400 ft., at its plant at Elmwood Avenue and the New York Central Railroad Belt Line.

The Empire Axle Company, Dunkirk, N. Y., has awarded contract for an addition to its plant.

The Utica Heater Company, Whitesboro, N. Y., has let contract for a one-story addition to its foundry 80 x 144 ft. E. G. Munn is manager.

The E. H. Crawford Company, Buffalo, N. Y., has been incorporated to manufacture asbestos goods and insulating materials by E. and H. H. Crawford, 71 Leroy Avenue, and F. A. Dorsett, Buffalo. The capital stock is \$30,000.

The Buffalo, Rochester & Pittsburgh Railroad Company, Rochester, is to have a machine shop and erecting shop and an addition to roundhouse erected at Salamanca by Westinghouse Church Kerr & Co., Inc., 37 Wall Street, New York. E. F. Robinson is general manager.

The factory addition for the Jones Speedometer Company, which is to be erected on Cedar Street, New Rochelle, N. Y., by the H. W. Johns-Manville Company, New York, is to be 75 x 170 ft., four stories and basement.

The Dealers' Steam Packing Company, Palmyra, N. Y.,

J. Ballou, president, has prepared plans for an addition to its factory, 50 x 108 ft., one story.

The Portable Tool Supply Company, Buffalo, has been incorporated to manufacture machinery and supplies by D. E. Skellan, J. C. McKendricks and M. Friel, 287 Norwood Avenue. The capital stock is \$10,000.

The Newark Engineering & Refrigerating Company, 577 South Tenth Street, Newark, N. J., will build a one-story extension to its plant at 476 Eighteenth Avenue, 31 x 100 ft.

The Newark Cutlery Mfg. Company, Newark, N. J., has been incorporated with a capital of \$25,000, by Isadore H. Colton, Glayde A. Savage and D. Schneider.

The Nobbey Safety Razor Company of Massachusetts has acquired property at 120-28 Adams Street, Newark, N. J., for a new plant. The company will employ about 200 for initial operations. William C. Bolt is president.

The S. & K. Company, Peabody, Mass., has acquired property at 599-613 Third Street, Newark, N. J., for a branch leather plant. About 1500 will be employed in initial operations. John F. Kaiser is president.

The National Products Mfg. Company, Newark, N. J., has been incorporated with a capital of \$100,000 to manufacture gold and silver products. Bernard J. Radigan, Robert J. Metzler and Joseph Kruttschnitt are the incorporators.

The Heller Brothers Company, 879 Mount Prospect Avenue, Newark, N. J., manufacturer of rasps and files, has filed plans for an extension, one story, 40 x 92 ft., to cost \$13,725.

The Whitehouse Novelty Mfg. Company, 44 Hunter Street, Newark, N. J., manufacturer of ivory specialties, has acquired property adjoining its plant at 107-9 East Seventeenth Street, for an addition.

The Carnegie Steel Company, Pittsburgh, Pa., has filed plans for a one-story shop addition, 24 x 60 ft., to its warehouse at the foot of Bessemer Street, Waverly, N. J.

The Manufacturers' Can Company, 426 Mulberry Street, Newark, N. J., has commenced the operation of its plant at First and Essex streets.

The Letem Metal Company, Newark, N. J., has been incorporated with a capital of \$35,000 to manufacture steel and iron-treating specialties. George C. Hetmick, William H. Perrine and Ernest S. Fougner are the incorporators.

The Merchants Refrigerating Company, 161 Chambers Street, New York, has arranged for a bond issue of \$3,500,000 for extensions. The company is planning the erection of a cold-storage plant on the block bounded by Tenth and Eleventh avenues and Sixteenth and Seventeenth streets, New York, covering about 700,000 sq. ft. Of the bond issue \$2,000,000 will be arranged as a building fund. Frank A. Horne is president.

The Security Tube Company, Rutherford, N. J., has been incorporated with a capital of \$50,000 to manufacture tubing for automobile use. James F. Lynch, Joseph Zimmerman and Eliot Norton are the incorporators. L. M. Loss, 14 Chestnut Street, is local agent.

The American Spring Mfg. Company, Jersey City, N. J., has been incorporated with a capital of \$25,000 to manufacture bed springs and kindred products. Samuel Newman, Samuel Halpern and M. Halpern, Hoboken, are the incorporators.

The Joseph Dixon Crucible Company, Monmouth Street, Jersey City, N. J., manufacturer of graphite products, will build a three-story addition to its plant at 280-84 Mercer Street to cost \$250,000.

The Standard Oil Company, Jersey City, N. J., has awarded a contract for the erection of additions to its plant, including a cooperage factory at Caven Point to cost \$102,300. The Turner Construction Company, 11 Broadway, New York, is the contractor.

The Edgewater Foundry Company, Edgewater, N. J., has been incorporated with a capital of \$10,000 to operate a foundry. Joseph Fuchs, Frederick Butzhah and A. W. Brain, Edgewater, are the incorporators.

The Tidewater Oil Company, Constable Hook, Bayonne, N. J., manufacturer of petroleum products, has increased its capital from \$30,000,000 to \$40,000,000 for extensions. R. D. Benson is president.

The Lawson Crowning Machine Company, Inc., New Brunswick, N. J., has been incorporated with a capital of \$25,000 to manufacture crowning machinery. A. D. Watson, M. A. Harkins and M. P. O'Donnell are the incorporators.

The Nelson Company, 238 Forty-fourth Street, Brooklyn, N. Y., manufacturer of cabinets, has acquired property comprising about 30,000 sq. ft. of space at Elizabethport, N. J., for a new manufacturing plant.

D. D. Vincent, L. H. Healy and J. F. O'Neil, Boonton, N. J., have incorporated in New York the Smiley Steel Com-

pany, with no par value to capital stock, to operate in iron and steel work.

The Borough Council, Hightstown, N. J., will install new boiler equipment at the municipal waterworks.

The Westinghouse Lamp Company, Bloomfield, N. J., has filed plans for the erection of a four-story addition to its plant on Arlington Avenue, 140 x 804 ft., to cost about \$62,000.

The Standard Iron Works, Inc., 540-50 West Fifty-eighth Street, New York, structural steel and iron worker, has purchased property at 508-10 East Seventy-fourth Street, 50 x 102 ft., and plans for the removal of its plant to the new location.

## Philadelphia

PHILADELPHIA, PA., March 19, 1917

The Griebel Instrument Company, successor to the Carbondale Instrument Company, manufacturer of thermometers, hydrometers, laboratory supplies, etc., Carbondale, Pa., will have bids taken in about one month by Raymond Tiffany, M. & M. Bank Building, Carbondale, for a two-story factory, 45 x 75 ft., to cost \$10,000. Ernest Griebel, 21 Salem Avenue, is the proprietor.

Caskey & Keen, Inc., Philadelphia, recently incorporated with a capital of \$100,000 to manufacture machinery and iron castings, has acquired a four-story foundry at Sixth and Berks streets, for about \$40,000. William J. Steen and David L. Moore, Jr., are officers of the company.

The Barrett Company, Philadelphia, manufacturer of roofing and paving products, has awarded contract to W. W. Lindsay & Co., Harrison Building, Philadelphia, for a one-story brick and concrete boiler house, 50 x 82 ft., at its Marcus Hook plant. Plans have also been filed for an addition to its plant at Wakeling and Stiles streets.

The Atlantic Refining Company, 3144 Passyunk Avenue, Philadelphia, manufacturer of oils, etc., has acquired 21 acres of land at Jackson Street and Schuylkill Avenue, for extensions.

The S. A. Ashman & Son Company, 2300 East Tioga Street, Philadelphia, manufacturer of forgings, will build a shop addition to cost about \$2,000.

Charles Christos, 2821 Helen Street, Philadelphia, has awarded a contract for a new power plant at his textile works at Hunting Park Avenue and Stockley Street.

The Belmont Iron Works, 2215 Washington Avenue, Philadelphia, has awarded contract for a one-story addition to its plant, 107 x 145 ft., at Twenty-third Street and Washington Avenue, to cost \$10,000.

The New York Shipbuilding Company, Camden, N. J., is making extensions to double the capacity of its plant.

The Federal Iron Works, Camden, N. J., has been incorporated, with a capital of \$10,000, and has established local office at 207 South Second Street. M. A. Testa, J. C. and J. M. Schwartz are the incorporators.

The Enterprise Pottery Company, Trenton, N. J., will build an addition to its plant to cost about \$14,000.

The United States Asbestos Company, Manheim, Pa., manufacturer of asbestos products, has been acquired by Chester L. Hill and S. R. Zimmerman, Lancaster. The new owners are reported to be planning to double its capacity.

Edward T. McGowan, John Neason and Charles W. Griffith, Altoona, Pa., have incorporated in Delaware the Exhaust Vulcanizer Company, with a capital of \$50,000, to manufacture exhaust-heated vulcanizers.

The Inter-State Feed Machine & Products Company, 642 East Mason Street, York, Pa., is considering the erection of a new plant at Ephrata, for the manufacture of feed machines.

The North American Motors Company, Pottstown, Pa., is taking bids for the erection of a two-story and basement factory, 50 x 72 ft.

The Alvord Reamer & Tool Company, Millersburg, Pa., recently incorporated to manufacture machinery, tools and castings, has increased its capital from \$10,000 to \$20,000 and has issued bonds for \$50,000 for expansion. Frederick T. McGuire, 6830 Gorston Avenue, Philadelphia, and Harry A. Stone, 9834 Anderson Avenue, Philadelphia, are among the incorporators.

David Gutschall, Blain, Pa., is planning the establishment of a plant for the manufacture of brooms by machinery. The proposed plant will be located at Beavertown, nearby, and will be known as Gutshall & Son, David Gutshall, Jr., also being associated with the business.

The Lehigh Valley Railroad will make extensions in its

repair shops at Hazleton, Pa., including the operation of the plant by electric power.

The Cashman Tool Company, Waynesboro, Pa., will be incorporated, with a capital of \$100,000, by C. G. and J. O. Cashman. It has recently acquired the property of the Wayne Paint Company, where it will establish a plant for the manufacture of a reamer.

Fire March 14 destroyed part of the plant of the Aetna Explosives Company, Emporium, Pa., with loss estimated at \$50,000. The destroyed section will be immediately rebuilt. Headquarters of the company are at 120 Broadway, New York.

William M. Hummel, Lewistown, Pa., inventor of an electric operator for mine doors, is said to be planning the establishment of a plant for its manufacture.

The Armstrong Cork Company, Lancaster, Pa., is planning the erection of three additions requiring about 1500 tons of structural steel. Bids for construction are now being asked. Headquarters of the company are at Pittsburgh.

The Beacon Light Company, Chester, Pa., a subsidiary of the Philadelphia Electric Company, Philadelphia, is taking bids for the erection of a new five-story steel and concrete plant, about 200 x 400 ft.

## Baltimore

BALTIMORE, MD., March 19, 1917.

Improvements to cost in the neighborhood of \$2,500,000 are to be made by the Newport News Shipbuilding & Dry Dock Company, Newport News, Va., to take care of a Government contract. These will include two new shipways to cost about \$600,000 each, new shops and other extensions. Work now is being rushed on a new turret shop and the other work will begin immediately. Sidney Wood is assistant to the president.

The Baltimore Pump Company, Munsey Building, Baltimore, has been incorporated, with \$600,000 capital stock, to manufacture a steam pump. The incorporators are William H. Dempsey, Jr., Eustis H. Thompson and Herbert B. Stimpson.

The Maryland Meter Works, Saratoga and North streets, Baltimore, manufacturer of gas meters, has plans for a six-story addition, 52 x 94 ft.

The Alexander Milbourn Company, 1418 West Baltimore Street, Baltimore, manufacturer of acetylene gas apparatus, has plans for enlarging its factory.

The McNeill Ornamental Iron & Construction Company, Baltimore, Md., has purchased property at 457-461 East Grindall Street, which it will occupy April 1. This will give it a larger shop than it has at present. Edmund J. McNeill is president.

The New York & Hagerstown Metal Stamping Company, Hagerstown, Md., advises that recent reports of contemplated extensions to its plant are incorrect. The company at present has a large surplus of floor space not in use.

The National Enameling & Stamping Company, 1901 Light Street, Baltimore, has plans for a four-story brick and steel addition to cost between \$50,000 and \$60,000.

The Baltimore River & Mfg. Company, 412 Equitable Building, Baltimore, has leased an additional building at Front and Hillen streets.

## Indianapolis

INDIANAPOLIS, IND., March 17, 1917.

The Diamond Clamp & Flask Company, Richmond, Ind., has been incorporated with \$30,000 capital stock to manufacture metal products. The directors are Forrest J. Gartside, E. J. Gartside and E. Miller.

The Insley Mfg. Company, Indianapolis, iron manufacturer, has increased its capital stock from \$25,000 to \$150,000.

The Wabash Cabinet Company, Wabash, Ind., has increased its capital stock from \$150,000 to \$325,000.

A new machine shop, tool shop and car repair shop, to be erected at Richmond, Ind., to cost \$530,000, is part of the improvements planned by the Pennsylvania Railroad this year.

The Rubber Regenerating Company, Mishawaka, Ind., has been sold to the United States Rubber Company, Broadway and Fifty-eighth Street, New York. The company employs about 600 men.

A building permit has been issued to the Indianapolis Light & Heat Company, Indianapolis, Ind., for a power plant to cost \$200,000. It is to be built adjacent to the present

power house on Kentucky Avenue and will be six stories, 100 x 200 ft., equipped with two 30,000-hp. units, a boiler room with five 800-hp. boilers, space for condensers, pumps, heaters and coal bunkers. It is expected the plant will be completed by October, when the present building will be razed and a new unit built.

The Jasper Novelty Company, Jasper, Ind., has let the contract for a three-story addition to its plant to cost \$13,500.

The Sullivan Mfg. Company, recently incorporated at Sullivan, Ind., has leased buildings and will manufacture auto trucks and patent wagon beds. The directors are C. H. Stratton, W. T. Mellott, W. A. Billman, William Alsman and W. H. Bridwell.

## Chicago

CHICAGO, ILL., March 19, 1917.

Harold A. Howard, 38 South Dearborn Street, Chicago, has purchased the property at Racine Avenue and Twenty-first Street, and will erect a one-story factory to cost approximately \$55,000.

The Chicago Motor Bus Company, 11 South LaSalle Street, Chicago, is building a repair shop at 1124 Rosemont Avenue, 85 x 175 ft.

Harry I. Holton, 140 South Dearborn Street, Chicago, will build a one-story sheet-metal shop, 50 x 125 ft., at an estimated cost of \$15,000.

Paul Gerhardt, architect, 64 West Randolph Street, Chicago, is preparing plans for a large plant to be built in the Central Manufacturing District at a cost of \$200,000. The buildings will include a foundry.

The Alexian Brothers Hospital, 1200 Belden Avenue, Chicago, is building an addition to its repair shop, which will cost \$6,000.

The Union Petroleum Company, 4345 Southwest Boulevard, Chicago, is building a one-story pump house at a cost of \$10,000.

Armour & Co., Inc., Union Stock Yards, Chicago, is about to erect a three-story pump house to cost approximately \$45,000.

The Union Drop Forge Company, 1700 North Kostner Avenue, Chicago, is erecting as an addition to its plants a one-story factory, 78 x 156 ft., at an estimated cost of \$15,000.

D. S. Klaffer, architect, 64 West Randolph Street, Chicago, is receiving bids for a steel frame foundry for H. K. Kramer, 75 x 127 ft.

The Union Petroleum Company, Chicago, will erect a one-story brick pump house at 4345 South Western Avenue, to cost \$10,000.

The Sellers Mfg. Co., 4561 Malcolm Avenue, Chicago, will build a one-story steel shop, estimated to cost \$5,000.

The National Lock Company, Chicago, has increased its capital stock from \$500,000 to \$1,000,000.

James A. Miller, Chicago, has had plans prepared for a one-story brick factory to be erected at 552-54 West Adams Street, at a cost of \$14,000.

Bernard Loesche, Chicago, will build a one-story brick garage at 2308 Wentworth Avenue to cost \$8,500.

A. K. Johnson, 2812 West North Avenue, Chicago, has had plans prepared for a three-story brick plant to be erected at that address at a cost of \$6,500.

Van Schaack Brothers, Chicago, will build a two-story brick office and factory building at 3402 Henderson Avenue to cost \$8,000.

The Jackson, Schmitz & Shanks Mfg. Company, Chicago, has been incorporated, with a capital stock of \$20,000, to manufacture tunnel and excavation machinery specialties. Henry A. Schmitz, Appleton, Wis., is president. The plant will be located at 11 to 17 DesPlaines Street, Chicago.

The Stefan Schneider Ball-Bearing Mfg. Company, Chicago, has been incorporated at Dover, Del., with a capital of \$200,000, to manufacture ball bearings and machinery. Stefan Schneider, Max Spiegel and Alphonse Lefkow, Chicago, are the incorporators.

The International Motortruck Wheel Corporation, Chicago, has been incorporated at Dover, Del., with a capital of \$1,000,000, to manufacture motor truck wheels. Franklin A. Frommann, Edward F. Kaul and Arthur L. Richtmyre, Chicago, are the incorporators.

The Royal Canner Mfg. Company, Albion, Ill., has been incorporated at Dover, Del., with a capital of \$250,000, to manufacture canning machinery. George W. Bince, J. C. Carlyle and Robert T. Barber, Albion, are the incorporators.

W. E. Gehling, 504 First National Bank Building, Chicago, has had plans prepared for a one-story brick garage to be erected at 1619-31 South State Street, at a cost of \$20,000.

The Victoria Livery Company, Chicago, is about to erect a one-story garage and machine shop, 60 x 178 ft., for which

L. G. Hallberg & Co., 19 South LaSalle Street, are taking bids.

The Rock Island Mfg. Co., Rock Island, Ill., is having tentative plans prepared for an additional building and larger foundry, the estimated cost of which is about \$30,000. If the plans are adopted the work will be completed this summer.

The Chicago Hardware Company, Waukegan, Ill., is planning extensive additions to its plant.

The Cabirange Mfg. Company, Belleville, Ill., has increased its capital from \$10,000 to \$75,000 and will build a new factory.

The Illinois Corrugated Metal Company, Bloomington, Ill., will change its location from Bloomington to Springfield.

The Continental Machine & Foundry Company, Fort Madison, Iowa, has been reorganized. Increases in the equipment and capacity of the company's machine shop and foundry are contemplated. C. O. Frisbee, president of the Cornell Wood Products Company, becomes president of this company and R. A. Fisher continues as superintendent.

The Davenport Mfg. Company, Davenport, Iowa, has increased its capital stock from \$30,000 to \$150,000 and will build a new factory to cost about \$100,000. The most modern equipment obtainable will be installed.

L. M. Allen and Charles Keeler will build a garage at 311 East Third Street, Davenport, Iowa, to cost \$20,000. It will be 89 x 166 ft.

The Repass Automobile Company has plans for a garage and business building on Park Avenue West, Waterloo, Iowa, estimated to cost \$100,000.

### Catalogs Wanted

R. W. Baily, mechanical engineer, 122 South Michigan Boulevard, Chicago, would like to receive catalogs covering the following material in connection with a steel foundry to be built in Chicago or Cleveland, to cost about \$100,000:

- One 30-in. cupola.
- One 5-ton three-motor 50-ft. traveling crane.
- One 5-ton three-motor 40 ft. traveling crane.
- One cupola blower, 14-oz. pressure.
- One corrector blower, 2-lb. pressure.
- One two-stage air compressor, 60-lb. pressure.
- One hydraulic pressure pump, 2000-lb. capacity, belted.
- One water service pump, belted.
- One annealing furnace.
- One sand-blast machine.
- Two stands, emery grinders, motor or belt-driven.
- Six chipping hammers.
- Two rammers.
- One core baking oven.
- Two air or motor-driven sand screens.
- Two sand mixers.
- One Chilean mill.
- One Carr disintegrator.
- One oil injecting pump for furnace.
- One track scale, standard gage.
- Two hydraulic foundry elevators.

## Milwaukee

MILWAUKEE, WIS., March 19, 1917.

Tool builders hold out no encouragement that deliveries can be made on current bookings until five to seven months have elapsed, but orders are being placed in such volume that the time between booking and deliveries is gradually widening. It is a rare exception to find a shop that is not booked up long past the end of this year.

The Stegeman Motor Car Company, 606 Linus Street, Milwaukee, has increased its capital stock from \$100,000 to \$200,000 to quadruple its manufacturing facilities. The company is now erecting new machine and assembling shops which will be ready for operation about April 10. A new office building and engineering room were completed March 15. L. G. Schertl, formerly of the Robert Rom Company, Milwaukee, will be secretary, treasurer and director of sales. Oscar Stegeman is president, general manager and chief engineer.

The Electric Steel Castings Company, 802 First National Bank Building, Milwaukee, organized about eight months ago by Leo G. Smith, formerly general superintendent of the Prime Steel Company, Milwaukee, to establish an electric steel foundry in West Allis, probably will locate elsewhere because of its inability to make contracts for current. Plans had been completed for a jobbing foundry with an output of about 500 tons per month, requiring 25,000 kw. per 24 hr., and a second unit of the same capacity, to be built within six months. It is stated, however, that the electric power company has notified the company that it has reached the limit of available power for such service and will not be able to make further contracts for its use. Negotiations accordingly have been opened with a number of Middle Western cities with a view to locating the plant at some

point where cheap power is available. The Electric Steel Castings Company is incorporated with a capital stock of \$300,000, which is to be increased to \$600,000 later. The first unit will consist of a foundry, 80 x 500 ft., with auxiliary structures, and equipped with Heroult furnaces.

The Oneida Motor Truck Company, Green Bay, Wis., organized recently with \$300,000, has elected the following officers: President, F. E. Burrall; vice-president, J. C. Fogarty; secretary, J. P. Nugent; treasurer, Mitchell Joannes.

C. D. O'Connor, Calumet, Mich., has leased the former plant of the Superior Brass Foundry, Laurium, Mich., and will produce a knockout nut for mining equipment.

Brodhead, Wis., is contemplating the reconstruction of the municipal hydroelectric light and power plant to cost about \$20,000.

It is reported that the Aluminum Goods Mfg. Company, Manitowoc, Wis., is contemplating the establishment of a branch plant employing 200 workmen, in Sheboygan. Further details are not available.

The Standard Steel Corporation, Milwaukee, recently incorporated, with \$50,000 capital, to manufacture barn equipment, concrete mixers, etc., is in correspondence with commercial clubs in several Wisconsin cities with a view to establishing its permanent plant. E. J. DeGuenther, Merrill Building, Milwaukee, is president.

The Cutler-Hammer Mfg. Company, Milwaukee, maker of electric controlling devices, has purchased the Fullerton electric paper conveyor business of the Dispatch Printing Company, St. Paul, Minn., and will manufacture the system at Milwaukee.

The Western Coil Company, Chicago, organized several months ago by James W. Gilson, formerly of the Mitchell-Lewis Motor Company, Racine, Wis., has purchased the Citizens' Telephone Building, Racine, and is remodeling it for the production of electrical appliances, portable X-ray machines, violet ray instruments, etc. The removal will be effected within 30 days. The new plant will employ from 75 to 100 workmen.

The West Bend Aluminum Company, West Bend, Wis., manufacturer of kitchen utensils and sheet aluminum goods, has decided to postpone the erection of additions until the building material market becomes more favorable. Instead, it has again leased the buildings it originally occupied, but abandoned when the present plant was built, and will equip them with new machinery.

The Menominee Motor Truck Company, Menominee, Mich., is preparing to build additions to its plant in order to handle increasing business. The company recently rejected an offer to move its works and headquarters to Green Bay, Wis., and enlarged its real estate holdings in Menominee to include more than 8 acres. Gould Watson is secretary.

The Milwaukee Electric Crane & Mfg. Company, Milwaukee, organized several months ago with a capital stock of \$300,000, expects to start production April 1 or 15 in the former plant of the Fred M. Prescott Steam Pump Company in West Allis. The Prescott works are being thoroughly overhauled and new equipment installed. Officers have been elected as follows: President, S. H. Squier; vice-president, M. A. Beck; second vice-president, Arthur A. Fritsch; secretary-treasurer, M. P. O'Brien. Mr. Beck will be chief engineer and Mr. Fritsch, sales engineer. The product will be electric traveling cranes, hand cranes and hoists. The organizers of the company were formerly associated with the Pawling & Harnischfeger Company, Milwaukee.

The Davis Mfg. Company, Milwaukee, will award contracts early in April for the erection of a new foundry unit, 100 x 300 ft., of brick, steel and concrete, designed by the company's own engineers. Work is now under way on a new machine-shop unit, 144 x 225 ft. The plant is located at Fifty-seventh Avenue and Mitchell Street, West Allis. George W. Kliegel is secretary and treasurer.

The Ideal Barn Equipment Company, Horicon, Wis., has been incorporated with a capital stock of \$50,000, and will build a plant costing \$25,000. The general contract has been awarded to the Hutter Construction Company, Fond du Lac, Wis. Frank H. Bogda is vice-president and general manager.

The Schaefer Mfg. Company, Berlin, Wis., maker of condensed milk factory equipment, has broken ground for several connecting additions to its shops to provide more machine-shop and assembling space. The capacity will be increased 50 per cent. New tools, cranes and other equipment will be installed. Frank Chapman is general manager.

The P. B. Mfg. Company, manufacturer of electrical fittings, Milwaukee, has increased its capital stock from \$25,000 to \$50,000, and is now building a factory to be completed May 1.

Oluf Enger, Chippewa Falls, Wis., has started operations in the former plant of the Bloomer Machine Works, Bloomer, Wis., and will do a general machine repair business.

The S. P. Stove Company, Johnson Creek, Wis., has been incorporated, with a capital of \$25,000, by Herman F. Prenzlow, Gustave Trachte and Arthur Becker.

R. Gumz & Co., Milwaukee, meat packer, has awarded contracts for the erection of a brick and steel refrigerating and office building, 57 x 130 ft., at Muskego Avenue and Canal Street, to cost \$35,000.

The Falk Company, Milwaukee, has started excavations for a shop addition, 184 x 275 ft., at the foot of Thirtieth Street, in the Menominee valley. The enlargement is made necessary by the increased demand for Wuest herringbone gears and other specialties manufactured by the company, which operates a large steel foundry, machine shop and railway specialty works. Between 200 and 300 men will be added to the force when the addition is completed.

The Federal Pressed Steel Company, Milwaukee, has purchased 5 acres adjoining its plant at Keefe Avenue and Becher Street, to provide a site for future additions. While no details are announced, it is said that the company is preparing to undertake extensive enlargements the present year. E. J. Lansing is secretary.

The Damrow Brothers Company, Fond du Lac, Wis., sheet metal and tinning works, has increased its capital stock from \$25,000 to \$75,000 and contemplates the erection of an addition in the spring.

Trachte Brothers, Madison, Wis., sheet iron tanks and other sheet metal specialties, has leased a factory in Des Moines, Iowa, and will open a branch plant at the end of March. The company is owned by A. F. Trachte and John H. Albrecht.

## Detroit

DETROIT, MICH., March 19, 1917.

The machine-tool market remains unusually strong, despite the lack of large orders. Dealers state that the international crisis and the railroad situation are factors which are causing manufacturers to refrain from placing large orders. Never before have so many new companies in this section been incorporated for manufacturing purposes, and orders for initial equipment make the market unusually active. Labor conditions are excellent, with skilled and unskilled labor in great demand. From five to seven months are demanded on the delivery of standard machines, in spite of the fact that customers are demanding equipment immediately.

The Detroit Motors Company, Detroit, which has a capital stock of \$4,000,000, and is a recent merger of the Detroit Motor Car Company and two manufacturers of motor car parts, is planning to enlarge its factory space and install equipment to produce 5000 cars a year. W. R. Bamford will be president.

The Bay City Auto Body Company, Bay City, Mich., has purchased a building on the Pere Marquette Railroad and will move into its new quarters in a few days.

The Linderman Steel & Machine Company, Muskegon, Mich., will soon double its capacity to handle a contract for shells to be used by the United States Government.

The Field Mfg. Company, Ionia, Mich., will move its plant to Owosso.

The Jordan & Steele Mfg. Company, Hastings, Mich., has increased its capital from \$10,000 to \$30,000, and will move to Charlotte, Mich. It manufactures a gravel loader and also does a general machine shop business.

The Hayes-Ionia Company, manufacturer of automobile bodies, has taken a lease on the uncompleted plant of the National Matter Company, Grand Rapids, Mich., and will move there shortly. The factory has 200,000 sq. ft. of floor space and will give employment to 400 men. The capital will be increased from \$70,000 to \$500,000 in common stock and from \$80,000 to \$180,000 in preferred.

The Detroit United Railway, Detroit, Mich., has started construction work on its proposed buildings and storage yards on the River Rouge, near Detroit. The plant will cost \$400,000 and it will contain besides office headquarters a car repair shop, a machine shop, a foundry and other departments. Frank W. Brooks is president.

The Commerce Motor Car Company, Detroit, manufacturer of motor trucks, will build another addition, four stories, 100 x 300 ft., which will adjoin its factory buildings at Solvay and Mackie streets.

The Ireland & Matthews Mfg. Company, Detroit, Mich., has purchased 7 acres on the Michigan Central Railroad and will erect a new plant. It is at present largely engaged in the manufacture of munitions.

T. S. Sprague, Detroit, is organizing the Sprague-Blackmer Engineering Company, capitalized at \$350,000, at Ann

Arbor, Mich., to manufacture the Blackmer positive rotary pumps.

K. H. Sheldon & Co., Muskegon, have engaged in the manufacture of industrial and scientific school and factory supplies with an authorized capital stock of \$350,000.

The Raymond Garage Equipment Company, Adrian, Mich., has completed its organization and will manufacture equipment for garages. S. W. Raymond is president.

The Detroit Edison Company, Detroit, Mich., will begin work in the spring on the erection of a power house at Port Huron, Mich.

The Reo Motor Car Company, Lansing, Mich., has acquired the Gier Pressed Steel Company's factory. It recently acquired the old Bement plant, with a floor space of 41,000 sq. ft.

The Michigan Crown Fender Company, Ypsilanti, Mich., has increased its capital stock from \$100,000 to \$200,000.

The Michigan Brass & Electric Company, Lansing, Mich., has increased its capital stock from \$10,000 to \$25,000.

The Holihan Mfg. Company, Detroit, manufacturer of automobile parts, has moved into its new factory on the Pere Marquette Railroad at Milford Street. The new building doubles the former floor space.

The Battle Creek Stamping Company, Battle Creek, Mich., recently incorporated with a capital stock of \$10,000 to manufacture steel waste-paper balers and conduct a general line of metal stamping, is just putting in operation a plant which it has equipped with about \$2,000 worth of machinery. W. D. Baker is president; L. W. Macomber, vice-president; S. B. Hollman, secretary, and S. C. Coleman, treasurer. The company is a close corporation composed of the above officers.

## Cleveland

CLEVELAND, OHIO, March 19, 1917.

Inquiry for standard machine tools is heavy. The demand is largely for lots of two or three tools for early shipment. The call for radial drilling and shaping machines is apparently more active than for other machine tools. The demand for planing machines, however, continues good. Business is coming from widely scattered sources, although in the automobile field little demand exists at present. Deliveries in some lines have improved somewhat, and buyers by shopping around are able in many cases to secure machines for early delivery.

The machinery list of the Nickel Plate Railroad, given below, is the largest railroad list which has come out in this market for a long time. The New York Central Railroad is expected to place orders in a few days for about 15 machines on a list sent out two or three months ago. The Firestone Tire & Rubber Company, Akron, Ohio, is understood to have purchased in the past week the bulk of the machinery in its list sent out a few weeks ago.

The New York, Chicago & St. Louis Railroad has issued the following list of machinery requirements, through its purchasing department in Cleveland.

One 30-in. x 8-ft. heavy-duty engine lathe, belt or motor driven.

One 28-in. x 10-ft. heavy-duty engine lathe, belt or motor driven.

One 24-in. x 8-ft. heavy-duty engine lathe, with taper attachment, belt or motor driven.

Two 3-in. heavy-duty turret lathes, belt or motor driven.

One 36-in. heavy-duty boring mill, with one side head and one vertical head, belt or motor driven.

Two bolt-centering machines with capacity from 1 in. to 4 in., belt driven.

Two 6-in. power hack saws, belt driven.

Two heavy-duty crank shaping machines, belt or motor driven.

One 24-in. heavy-duty slotter, motor driven.

Two single-spindle small speed drilling machines with capacity up to 17/32-in., belt driven.

One 42-in. heavy-duty planing machine, two heads on cross-rail and one side head, 10-ft. platen, motor driven.

One heavy-duty radial drilling machine with 6-in. arm and universal head, motor driven.

One heavy-duty high-speed drilling machine, with 12-in. throat, motor driven.

Two 84-in. wet guide grinding machines, belt driven.

One combination punching and shearing machine with 48-in. throat, motor driven.

One 1½-in. bolt header, motor driven.

One 4000-lb. single frame steam hammer.

One 42-in. power squaring shear.

One circle shearing machine.

One 8-ft. cornice brake.

One 4-in. pipe-threading machine, belt or motor driven.

One 250-lb. rapid-stroke hammer, belt or motor driven.

The Grant Motor Car Company, Cleveland, is having plans prepared by the W. S. Ferguson Company for a factory, 160 x 682 ft. and contemplates a second building, 140 x 160 ft.

The Cleveland Punch & Shear Works Company, Cleveland, is adding some shop equipment. Several machines have been purchased, and it is now in the market for an 8-ft. radial drilling machine and an 84-in. planing machine.

The Atlas Car & Mfg. Company, Cleveland, is in the market for a bulldozer and a punching and shearing machine.

The National Oxygen Company, Toledo, will establish a plant for the manufacture of oxygen for industrial purposes.

The Ashland Products Company, Ashland, Ohio, recently incorporated with a capital stock of \$100,000, has placed contracts for the erection of a two-story brick building, 42 x 150 ft. The company will make automobile jacks, plumbing specialties and playground apparatus.

The Hinde & Dauch Company, Sandusky, Ohio, will shortly place contracts for an extension, 100 ft. x 850 ft., to its corrugated board plant.

The Ohio Steel Foundry Company, Lima, Ohio, will shortly begin the erection of the first unit of its structural steel building, 125 x 700 ft.

The Holmes Automobile Company recently announced to establish a plant in Canton, Ohio, has been incorporated with a capital stock of \$2,500,000, and has elected the following officers: Arthur Holmes, president and treasurer; C. H. Rockwell, vice-president, and George W. Belden, secretary. It will either build a factory, providing about 120,000 sq. ft. floor space, or will acquire a building now unoccupied. Some machinery equipment will be purchased. For the first year, at least, the plant will be used mostly for assembling. The company will build its own engines, having the castings made in a Canton foundry, but its intention is to have other parts made outside.

The Central Machine & Tool Company, 1214 Dorr Street, Toledo, is erecting an addition to its factory, which it is stated will triple its capacity. The company manufactures dies, jigs and fixtures, and will devote a portion of its space to the manufacture of punch presses.

The Kent-Owens Machine Company, Toledo, will erect a four-story machine shop, adding 42,000 sq. ft. to its floor space.

The Fairbanks Steam Shovel Company, Marion, Ohio, will enlarge its manufacturing facilities by the erection of a steel foundry, 62 x 300 ft. A power plant will also be built in which will be installed a 1000-hp. engine and an 800-kw. generator.

The plant of the Barley Motor Car Company, Streator, Ill., will be moved to Mansfield, Ohio, where a new company has been organized and incorporated with a capital stock of \$1,000,000 under the name of the Halladay Motor Car Company, to manufacture pleasure cars. It will occupy the plant formerly used by the Baxter Stove Company.

The Transue-Williams Steel Forging Corporation, Alliance, Ohio, is building additions to its press and forging departments, 60 x 150 ft. and 80 x 60 ft., respectively. The Austin Company, Cleveland, has the contract.

The Canton Drop Forging & Mfg. Company, Canton, Ohio, does not contemplate an addition to its manufacturing facilities. The properties adjacent to its works were recently acquired for steel storage and similar purposes.

## Cincinnati

CINCINNATI, OHIO, March 19, 1917.

Railroad freight embargoes are causing some inconvenience to a number of manufacturers on both inbound and outbound shipments. Storage space in many plants is gradually being filled up with machine tools so that the makers are unable to forward to destination. The slackening demand for machines from the munition factories has been largely offset by the improved business from the railroads, that is noticeable even at this critical time. Automobile manufacturers continue steady customers, mostly for replacement purposes. Manufacturers of farming implements in this vicinity report a decided improvement in business, but they are somewhat handicapped on account of material, and, in some cases, delays in deliveries. The two leading car builders in central Ohio are busier than they have been for several years. The jobbing foundries are all operating on full time, and have not been compelled to close down on account of a shortage of either coke or pig iron.

The Ohio Mold & Foundry Company, Bond Hill, Cincinnati, which recently took over the foundry of the Lane &

Bodley Company to cast ingot molds, made its first shipment March 8. The foundry is now in full operation.

The Weeks Company, Hamilton, Ohio, recently incorporated, advises that all of its \$25,000 capital stock has been paid in and that a plant will be fitted up at Seventh and Walnut streets. A number of lathes, shapers, punch and drill presses, milling machines and other machine tools will be installed. It will operate in addition a copper and silver plating plant and a japanning room. A wood-working shop is also included in its plans. The company will act as consulting and designing engineers and will manufacture electrical heating and cooking appliances and other specialties.

The Davenport Paper Box Company, Cincinnati, has commissioned G. W. Drach, architect, to draw plans for a four-story factory, 100 x 156 ft., to be erected on Pearl Street.

The Standard Electric Tool Company, Cincinnati, whose capital stock was recently increased to \$40,000, expects to add to its manufacturing equipment at an early date. F. S. Baldwin is general manager.

Work has been commenced on the new plant of the Globe Folding Box Company, Cincinnati. The factory will be located at Mitchell Avenue, on the Cincinnati, Hamilton & Dayton Railroad, and will be fitted up with sufficient equipment to double the capacity of the present plant.

The Nydia Bank Lock Company, Lion Building, Cincinnati, manufacturer of builders' hardware, will increase its capital stock to \$100,000. The company is not now in the market for any equipment.

The new brass foundry of the Niles Tool Works Company, Hamilton, Ohio, is now in full operation. No additional equipment will be required at the moment.

The Stevens Mfg. Company, Dayton, Ohio, maker of screw machine products, dies, tools and fixtures, contemplates increasing the capacity of its plant, but is not yet ready to place orders for any machinery.

The Maxwell Motor Car Company, Dayton, Ohio, is making an addition to its new plant, 72 x 190 ft., of reinforced concrete.

The Winkler Printing Company, Springfield, Ohio, expects to erect a two-story building, 70 x 130 ft. Nothing except transmission and special equipment will be required.

The Columbus Union Oil Cloth Company, Columbus, Ohio, will be incorporated with \$500,000 capital stock and will take over the plants of the Columbus Oil Cloth Company and the Union Oil Cloth Company. The capacity of both plants will be increased.

The Jones Heel Company, Columbus, Ohio, has let contract for its new factory.

Borger Brothers, Columbus, Ohio, boiler and tank makers, are increasing the capacity of their plant. The necessary equipment has practically all been purchased.

The Berkhimer & Lammers Stove Company, Greenville, Ohio, expects to move into a new building at an early date and add equipment to increase its present output.

J. H. Sellers, Wellston, Ohio, heads a company that has purchased the idle plant of the Kyle Mfg. Company, Lancaster, Ohio. Press reports indicate that the plant will be refitted and operated as a jobbing machine shop.

The Star Mfg. Company, New Lexington, Ohio, has increased its capital stock from \$75,000 to \$150,000 and is reported to have tentative plans under way for a large addition to its plant. The company makes a specialty of mine pumps.

## The Central South

LOUISVILLE, Ky., March 19, 1917.

Embargoes and other traffic restrictions imposed by the railroads, together with the strike prospects, have given the local trade a week of suspense. One cooperage plant, employing 200 workmen, closed down last Friday to await return of normal conditions. Inquiries in most lines continue numerous. Both coal and oil development work are calling for equipment without regard to price. Engines, boilers, pumps and motors are in good demand.

The Inman Veneer & Panel Company, Louisville, has been incorporated, with \$200,000 capital stock, and has begun the erection of a three-story brick factory, 121 x 204 ft., to cost \$50,000. Charles W. Inman, E. E. Sutton and others are the incorporators.

The Belknap Hardware & Mfg. Company, Louisville, jobber and manufacturer, has increased its capital to \$4,000,000. William Heyburn is president.

W. A. Gardner, commissioner of public property, Paducah, Ky., will purchase additional equipment for the municipal lighting plant, including two 300-hp. water-tube boilers and two 300-kw. alternating current, 60-cycle, three-phase genera-

tors, direct connected to compound non-condensing engines.

The Campbellsville Electric Light & Power Company, Campbellsville, Ky., has been incorporated, with a capital stock of \$40,000, by Charles Walls, C. L. Hesser and others.

The Rockwood Stove Works, Rockwood, Tenn., has increased its capital from \$25,000 to \$37,500.

The Clarksville Foundry & Machine Company, Clarksville, Tenn., has been incorporated with \$10,000 capital stock by T. B. Foust, Callis Tate, H. M. Byers and others.

The O. B. Andrews Company, Chattanooga, Tenn., has increased its capital from \$150,000 to \$200,000 and has begun the erection of an addition to its factory.

The John G. Duncan Company, Knoxville, Tenn., is asking for dealers' prices on a second-hand pony band sawmill, and on small-size standard-band sawmills.

## Birmingham

BIRMINGHAM, ALA., March 19, 1917.

Coal, ore and graphite mines are calling for a good lot of machinery and machine tools, owing to the extraordinary activity in opening new plants and enlarging old ones. There is not a place in the Alabama industrial field where development is not on a large scale. Consumers do not balk at prices. Quick delivery is the point insisted upon.

The National Pipe & Foundry Company, Attalla, Ala., manufacturer of cast-iron soil pipe and fittings, has added a complete line of cast-iron steam fittings to its products and is erecting a new plant to be completed June 1 for their manufacture. Eichel & Co., Richmond, Va., are the selling agents.

The Southern Manganese Company, Anniston, Ala., incorporated with a capital stock of \$3,000 by Ernest Humbert, C. P. Jeperson and others.

## St. Louis

ST. LOUIS, MO., March 19, 1917.

While deliveries of machine tools were slightly improved by the international situation and the embargoes on exportation, business for the past week showed uncertainty. Single tool orders and inquiries continue to prevail with no tendency to place large lists.

The George Flori Machine Company, St. Louis, has been incorporated, with a capital stock of \$20,000, by George, Joseph J., and Louis R. Flori and Richard L. Klein, to manufacture machinery.

The Southern Illinois Light & Power Company, St. Louis, J. J. Frey, Central National Bank Building, president, has bought the public service plants at Mt. Vernon, Ill., which it will improve.

The Waterman-Shaffer Lumber Company, Kansas City, Mo., has been incorporated, with a capital stock of \$500,000, by W. F. Ingham, C. T. McKnight and Hal Shaffer.

The Crystal Ice & Bottling Company, Crocker, Mo., has increased its capital stock from \$15,000 to \$25,000, and will install about \$10,000 worth of ice making equipment.

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Bodley Company to cast ingot molds, made its first shipment March 8. The foundry is now in full operation.

The Weeks Company, Hamilton, Ohio, recently incorporated, advises that all of its \$25,000 capital stock has been paid in and that a plant will be fitted up at Seventh and Walnut streets. A number of lathes, shapers, punch and drill presses, milling machines and other machine tools will be installed. It will operate in addition a copper and silver plating plant and a japanning room. A wood-working shop is also included in its plans. The company will act as consulting and designing engineers and will manufacture electrical heating and cooking appliances and other specialties.

The Davenport Paper Box Company, Cincinnati, has commissioned G. W. Drach, architect, to draw plans for a four-story factory, 100 x 156 ft., to be erected on Pearl Street.

The Standard Electric Tool Company, Cincinnati, whose capital stock was recently increased to \$40,000, expects to add to its manufacturing equipment at an early date. F. S. Baldwin is general manager.

Work has been commenced on the new plant of the Globe Folding Box Company, Cincinnati. The factory will be located at Mitchell Avenue, on the Cincinnati, Hamilton & Dayton Railroad, and will be fitted up with sufficient equipment to double the capacity of the present plant.

The Nydia Bank Lock Company, Lion Building, Cincinnati, manufacturer of builders' hardware, will increase its capital stock to \$100,000. The company is not now in the market for any equipment.

The new brass foundry of the Niles Tool Works Company, Hamilton, Ohio, is now in full operation. No additional equipment will be required at the moment.

The Stevens Mfg. Company, Dayton, Ohio, maker of screw machine products, dies, tools and fixtures, contemplates increasing the capacity of its plant, but is not yet ready to place orders for any machinery.

The Maxwell Motor Car Company, Dayton, Ohio, is making an addition to its new plant, 72 x 190 ft., of reinforced concrete.

The Winkler Printing Company, Springfield, Ohio, expects to erect a two-story building, 70 x 130 ft. Nothing except transmission and special equipment will be required.

The Columbus Union Oil Cloth Company, Columbus, Ohio, will be incorporated with \$500,000 capital stock and will take over the plants of the Columbus Oil Cloth Company and the Union Oil Cloth Company. The capacity of both plants will be increased.

The Jones Heel Company, Columbus, Ohio, has let contract for its new factory.

Borger Brothers, Columbus, Ohio, boiler and tank makers, are increasing the capacity of their plant. The necessary equipment has practically all been purchased.

The Berkhimer & Lammers Stove Company, Greenville, Ohio, expects to move into a new building at an early date and add equipment to increase its present output.

J. H. Sellers, Wellston, Ohio, heads a company that has purchased the idle plant of the Kyle Mfg. Company, Lancaster, Ohio. Press reports indicate that the plant will be refitted and operated as a jobbing machine shop.

The Star Mfg. Company, New Lexington, Ohio, has increased its capital stock from \$75,000 to \$150,000 and is reported to have tentative plans under way for a large addition to its plant. The company makes a specialty of mine pumps.

## The Central South

LOUISVILLE, KY., March 19, 1917.

Embargoes and other traffic restrictions imposed by the railroads, together with the strike prospects, have given the local trade a week of suspense. One cooperage plant, employing 200 workmen, closed down last Friday to await return of normal conditions. Inquiries in most lines continue numerous. Both coal and oil development work are calling for equipment without regard to price. Engines, boilers, pumps and motors are in good demand.

The Inman Veneer & Panel Company, Louisville, has been incorporated, with \$200,000 capital stock, and has begun the erection of a three-story brick factory, 121 x 204 ft., to cost \$50,000. Charles W. Inman, E. E. Sutton and others are the incorporators.

The Belknap Hardware & Mfg. Company, Louisville, jobber and manufacturer, has increased its capital to \$4,000,000. William Heyburn is president.

W. A. Gardner, commissioner of public property, Paducah, Ky., will purchase additional equipment for the municipal lighting plant, including two 300-hp. water-tube boilers and two 300-kw. alternating current, 60-cycle, three-phase genera-

tors, direct connected to compound non-condensing engines.

The Campbellsville Electric Light & Power Company, Campbellsville, Ky., has been incorporated, with a capital stock of \$40,000, by Charles Walls, C. L. Hesser and others.

The Rockwood Stove Works, Rockwood, Tenn., has increased its capital from \$25,000 to \$37,500.

The Clarksville Foundry & Machine Company, Clarksville, Tenn., has been incorporated with \$10,000 capital stock by T. B. Foust, Callis Tate, H. M. Byers and others.

The O. B. Andrews Company, Chattanooga, Tenn., has increased its capital from \$150,000 to \$200,000 and has begun the erection of an addition to its factory.

The John G. Duncan Company, Knoxville, Tenn., is asking for dealers' prices on a second-hand pony band sawmill, and on small-size standard-band sawmills.

## Birmingham

BIRMINGHAM, ALA., March 19, 1917.

Coal, ore and graphite mines are calling for a good lot of machinery and machine tools, owing to the extraordinary activity in opening new plants and enlarging old ones. There is not a place in the Alabama industrial field where development is not on a large scale. Consumers do not balk at prices. Quick delivery is the point insisted upon.

The National Pipe & Foundry Company, Attalla, Ala., manufacturer of cast-iron soil pipe and fittings, has added a complete line of cast-iron steam fittings to its products and is erecting a new plant to be completed June 1 for their manufacture. Eichel & Co., Richmond, Va., are the selling agents.

The Southern Manganese Company, Anniston, Ala., incorporated with a capital stock of \$3,000 by Ernest Humbert, C. P. Jeperson and others.

## St. Louis

ST. LOUIS, MO., March 19, 1917.

While deliveries of machine tools were slightly improved by the international situation and the embargoes on exportation, business for the past week showed uncertainty. Single tool orders and inquiries continue to prevail with no tendency to place large lists.

The George Flori Machine Company, St. Louis, has been incorporated, with a capital stock of \$20,000, by George, Joseph J., and Louis R. Flori and Richard L. Klein, to manufacture machinery.

The Southern Illinois Light & Power Company, St. Louis, J. J. Frey, Central National Bank Building, president, has bought the public service plants at Mt. Vernon, Ill., which it will improve.

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The Krogh Mfg. Company, San Francisco, manufacturer of pumping and irrigation machinery, has secured a permit for the construction of a machine shop to cost \$5,000.

George Brothers, Grass Valley, Cal., are enlarging their plant and will install pneumatic riveters, steam hammers and punching machinery.

The Pacific Steel & Copper Plate Company, San Francisco, has been incorporated with a capital stock of \$25,000 by G. R. Reed, C. M. Reed, A. A. Taft, V. J. De Mamlé and G. R. Reed, Jr.

The Associated Pipe Line Company is building a machine shop at Alta Vista, Cal.

The Standard Oil Company has plans drawn for additions to its plant at Richmond, Cal., the execution of the plans depending somewhat on the ability to secure steel, machinery and other materials.

The Pacific Electric Railway Company, Pacific Electric Building, Los Angeles, will build a one-story repair shop, 160 ft. square, at Echandia Junction.

The Industrial Bureau of the Chamber of Commerce, Los Angeles, has announced that the Coast Envelope Company, Indianapolis, Ind., will establish a local plant with capacity of 500,000 envelopes per day. William B. Emerson is president.

The Walter E. Small Machine Works, Los Angeles, specializing in pump and engine repair work, has removed its plant from 1624 South San Pedro Street to 1622 Santa Fe Avenue, to provide for extensions.

The Great Western Milling Company, Ninth and Alameda streets, Los Angeles, is planning for the erection of an addition of 50,000 sq. ft., to cost \$200,000. All machinery in the new plant will be individually motor-driven. H. E. Woolner is president.

Los Angeles, Cal., will build a new repair shop for municipal work at 2515 McPherson Street. The structure will be 35 x 140 ft., and will cost \$2,700.

The Culley & Saywell Company, South Pasadena, Cal., has been incorporated with a capital of \$50,000, to manufacture machinery and engines. M. L. Culley, 1617 Mission Street, W. W. Reesink, 1020 Fair Oaks Avenue, South Pasadena, and J. Saywell, 1335 American Avenue, Long Beach, are the incorporators.

John F. Craig, Long Beach, Cal., formerly principal owner of the Craig Shipbuilding Company, now operated as the California Shipbuilding Company, Long Beach, is planning the establishment of a new shipbuilding plant. R. H. Sayne will also be associated with the new company.

The Department of Agriculture, Washington, D. C., will soon call for bids for a machine shop and milling house at the Government kelp station now being erected at Summerland, Cal. It is said that proposals will be asked by J. W. Turrentine, Arlington Hotel, Santa Barbara, Cal.

The Rolph Coal & Navigation Company, San Francisco, Cal., has purchased the shipbuilding plant and yards of H. D. Bendixsen, Eureka, with adjacent water frontage of about 200 ft. James Rolph, Jr., mayor of San Francisco, is president.

## The Pacific Northwest

SEATTLE, WASH., March 13, 1917.

In the last week car shortage probably reached the peak of its intensity with regard to lumber shipments. The number of cars loaded for transcontinental markets shows at least 1000 short of normal. Exceptionally few orders were listed, as mills are following the policy of restricted acceptances until the unshipped business now congested at the mills is moved.

Lumber aggregating 9,500,000 ft., valued at \$150,000, will be shipped from Portland, Ore., according to a contract recently signed by Dant & Russell of that city, the shipments to go to Shanghai and Australia. This makes a total of 17,000,000 ft. of lumber which will leave Portland within the next few months for foreign ports.

The Alaska Engineering Commission, Seattle, recently opened bids for 12,000,000 ft. of lumber to be shipped to Anchorage, Alaska, for the Government railroad.

C. W. Pearson and associates, Starbuck, Wash., plan the construction of a grain elevator with a capacity of 130,000 bu., and to cost \$130,000.

The plant of the Carstens Packing Company, Tacoma, was damaged by fire recently with a loss of about \$100,000. It will be rebuilt.

The Pacific Steel & Boiler Company, Tacoma, Wash., recently awarded contracts for additions to its plant, to cost \$20,000. The main building will be 50 x 220 ft.

The Columbia River Shipbuilding Company, Portland, Ore., expects to be ready for operation in about two weeks.

Machinery for the fabrication of steel plates has been installed. The company holds contracts for six Norwegian steel steamers of 8800 tons each, besides two vessels for the Cunard Line.

The Kane Mfg. Company, Centralia, Wash., has formed a Canadian organization, which will manufacture the shock absorbers and indexing centers on which the company holds patents. P. W. Kane, president, states that plans are under way for enlarging the Centralia plant.

The furniture plant of Carman Mfg. Company, Seattle, Wash., was recently damaged by fire to the extent of \$25,000.

The C. A. Smith Lumber & Mfg. Company, Marshfield, Ore., plans the construction of a reclamation plant to be equipped with nine electric motors.

The Stoddard Lumber Company, Baker, Ore., plans improvements to its mills costing \$25,000. The sawmill will be replaced by a plant costing \$10,000, and the remainder of the funds will be used in constructing a boiler room and for additional machinery. The capacity will be increased from 65,000 to 90,000 ft. daily.

## Canada

TORONTO, ONT., March 19, 1917.

It is reported that the Polson Iron Works and the Thor Iron Works, both of Toronto, will receive orders amounting to approximately \$5,400,000 for the construction of steel ships. This is a part of the order for \$60,000,000 worth of ships the Dominion is contracting for to be constructed in Canada this year. The two yards are capable of turning out about 40,000 tons a year.

Tenders will be called in April by the town clerk of Montreal, South, Que., M. M. Condon, for a 30-hp. motor-driven turbine pump and a 150-hp. gasoline engine-driven turbine pump for fire purposes, etc. E. Drinkwater, 588 Boulevard Desaulniers, St. Lambert, Que., is the engineer.

The Northern Canada Power Company, Porcupine, Ont., is raising the capacity of its plant from 8000 hp. to 13,000 hp. One unit of 2500 hp. is now in the course of construction and the second unit will be installed within the next few months. The company also proposes to build a dam across Red Sucker Creek.

The Champion Engine Company, Ltd., Loretteville, Que., has been incorporated with a capital stock of \$12,000, by A. P. Patenaude, A. Barbeau, J. Verret and others to manufacture engines, etc.

The Maxwell Motor Company, Detroit, Mich., has purchased a 4-acre site at Windsor, Ont., and will erect a plant there.

The Kelsey Wheel Company, Windsor, Ont., manufacturer of bodies and wheels for automobiles, is contemplating making additions to double its present capacity.

Gilpin Brothers, Warton, Ont., are in the market for a spindle carving machine, with cutters and countershaft.

Redcliffe, Alberta, proposes to install new pumps of 1,500,000 gal. per day capacity, boilers, etc. J. F. Askwith is engineer.

The City Council, London, Ont., R. W. Shaw, chairman, proposes to install steam auxiliary equipment in connection with its incinerator, to cost \$25,000.

Construction work has been started on a new foundry at Montreal, for the Thomas Davidson Mfg. Company, Ltd., from designs by J. M. Robertson, Ltd., Montreal. The entire property of the company measures 140,000 sq. ft., only a part of which will be used at present, leaving room for future extensions. The building in course of erection is a steel foundry, one-story, 52 x 200 ft., while the electrical equipment necessary for operating the electrical furnaces will be housed in a structure 20 x 150 ft., semi-detached from the main building. The old building will be used as a cutting-off room and for inspection, while the remainder will in the future be used as a gray iron foundry. In the main bay of the foundry will be located four 6-ton electric furnaces of the single-phase type, the pouring floor and the ladle pits. The ladles will be heated by oil. A 20-ton overhead crane will be erected in the main bay for transporting heavy material. The electrical equipment for the plant will consist of two motor generator sets, etc.

The Taylor Engineering Company, Vancouver, B. C. has received a contract for the construction of a motor passenger vessel for the International Petroleum Company.

The Brown's Copper & Brass Rolling Mills, Ltd., New Toronto, Ont., announces that it has awarded a contract to the Southwark Foundry & Machine Company, Philadelphia, Pa., covering the installation of a 2000-ton hydraulic extrusion press equipment for the manufacture of brass rods. This machine will be in operation the early part of next May, and with present equipment will increase the output

over 5,000,000 lb. of finished rod per month. The new mill for sheet metals will also be in full operation in May, increasing the capacity of the sheet mills to over 5,000,000 lb. per month.

Tenders will be let soon for a factory for the Keenan Woodenware Mfg. Company, Owen Sound, Ont., to cost \$15,000. J. E. Keenan is manager.

The Dominion Machinery Company, 110 Church Street, Toronto, has commenced the erection of a plant to cost \$7,500.

Tenders will soon be received by J. C. Pennington, architect, Windsor, Ont., for a one-story brick and concrete machine shop for the Windsor Tool & Machine Company, Windsor, to cost \$10,000.

The Canadian Leatherboard Company will erect a factory at Chambly Canton, Que., and will purchase machinery. Plans are being prepared by T. Pringle & Son, 20 St. Nicholas Street, Montreal.

Work will be commenced at once on the erection of foundry for the International Malleable Iron Company, Ltd., Guelph, Ont., to cost \$15,000. W. A. Mahoney, Quebec Street, is the architect.

A new plant and office will be erected for the Stowell Screw Company, 70 St. Ambrois Street, Montreal, at Longueuil, Que. Construction work will be commenced at once.

The Dodge Brothers Motor Company, Ltd., Windsor, Ont., has been incorporated with a capital stock of \$100,000, by John F. Dodge, Horace E. Dodge, Frederick J. Haynes and others, all of Detroit, Mich., to manufacture automobiles, etc. It will establish a plant at Windsor, Ont.

The Angus Power Company, Ltd., Montreal, has been incorporated, with a capital stock of \$500,000, by Errol Languedoc, Jean P. Charbonneau, Ralph E. Allan and others, to generate electric light, heat and power.

The Signal Motor Truck Company of Canada, Ltd., Toronto, has been incorporated, with a capital stock of \$50,000, by John S. McLaughlin, 18 Oriole Gardens; Frederick E. Earl, 262 Sherbourne Street; James McFadden and others.

The Canadian Automatic Orchestras, Ltd., Toronto, has been incorporated, with a capital stock of \$75,000, by Frank Regan, 72 Queen Street, West, and others.

The F. N. Burt Company, Ltd., Toronto, has increased its capital stock from \$2,750,000 to \$3,500,000.

The Cardova Mining Company's plant, at Mormora, Ont., was destroyed by fire March 13, with a loss of \$100,000, when shaft No. 1, the stamp mill, two tank houses, the trestle and machine shop were destroyed. P. Kirksgaard is president and manager.

Pentiction, B. C., proposes to build a power development plant to cost \$60,000. The following equipment will be installed: A 250-hp. Diesel engine, two generators, etc. F. L. McKeever is engineer. The company will be in the market shortly for traveling cranes, quarry machinery, crushers, etc.

The Adjustable Dress Form Company of Canada, Ltd., Toronto, has been incorporated with a capital stock of \$40,000 by Ceell G. Clatworthy, 587 Ossington Avenue, Charles A. Ufford, Dorchester, Mass., and others.

Scott Murray, London, Ont., has been awarded contract for a boiler house for the Middlesex Mill Company, London, to cost \$10,000.

The Brunner Mond Company, Amherstburg, Ont., has had plans prepared for a plant for the manufacture of alkali products to cost \$300,000. Gordon S. Rutherford is manager.

The Nova Motor Company, Granville Street, Halifax, N. S., is having plans prepared for a garage to cost \$100,000. Frederick J. Mahar is manager.

Nelson, B. C., is contemplating the addition of a third unit to the city's power plant. W. E. Wasson is clerk.

The P. H. Klein, Jr. Company, Ltd., Montreal, has been incorporated with a capital stock of \$5,000 by Philip H. and John E. Klein, Westmount, Quebec; Henry B. Irving, Montreal, and others to manufacture electrical goods, etc.

The Auronolas, Ltd., Aurora, Ont., has been incorporated with a capital stock of \$40,000 by Samuel King, 235 Poplar Plains Road; Oscar H. King, William Cherry and others, all of Toronto, to manufacture musical instruments, records, etc.

The Brunett Sawmills Company, New Westminster, B. C., has taken out permit for an engine and boiler house.

Bridgeburg, Ont., has decided to install an electric pump in the municipal pump house. R. A. Land is clerk.

Islington, Ont., proposes to install a water system at a cost of \$82,000, including pumps, boilers, etc. James, Loudon & Hertzberg are the consulting engineers.

The Gummed Paper Company, Ltd., Brampton, Ont., proposes to erect a two-story addition to its factory and to install new machinery.

## Government Purchases

WASHINGTON, D. C., March 19, 1917.

The chief of the Bureau of Yards and Docks, Navy Department, Washington, will receive sealed proposals based on specification 2331, until 11 a. m. April 9, for one shipbuilding crane for Charleston.

The general purchasing officer for the Panama Canal, Washington, will receive proposals under circular 2110, until March 29, for furnishing one motor-driven automatic screw machine.

The chief signal officer, War Department, Washington, will receive sealed proposals until March 24, under proposal 930, for one universal trimmer, one calculating balance, one electric furnace, one welding and cutting outfit, one automatic hammer, one universal screw machine, one grinding machine, one milling machine, one pipe cutting machine, one cylinder grinding machine, one cutter tool and reamer grinding machine, one universal shaping machine, one turret lathe, one drilling machine, one vertical shaping machine, one bench lathe, one toolmaker's lathe, etc.

Sealed proposals will be received until 2 p. m. April 18 at the United States Reclamation Office, Denver, Col., for furnishing pumping machinery for the Yuma Valley Drainage plant, Ariz.

Bids were received by the Bureau of Supplies and Accounts, Navy Department, Washington, March 13, for furnishing supplies for the naval service as follows:

### Schedule 713, Ordnance

Class 1, Mare Island—one engine lathe—Eccles & Smith Company, \$5,100; H. Harms & Co., \$4,700 and \$4,736; Manning, Maxwell & Moore, Inc., \$4,046, \$4,985, \$4,911 and \$4,017; Niles-Bement-Pond Company, \$4,810; Pacific Tool & Supply Company, \$5,045; F. C. Stallman Supply Company, \$4,100; Fred Ward & Son, \$4,840.

### Schedule 751, Construction and Repair

Class 131, Boston—two steam hammers—Manning, Maxwell & Moore, Inc., \$805; Niles-Bement-Pond Company, \$750.

## NEW TRADE PUBLICATIONS

**Metal Sawing Machines.**—United Engineering & Foundry Company, Farmers Bank Building, Pittsburgh. Booklet. Devoted to hot and cold metal sawing machines. A complete description of the different machines built is given, the text being supplemented by illustrations of the construction and the various motor-driven types that are built with both electric and pneumatic feed. A number of views of installations are included, among which are those made at the plants of the Tata Iron & Steel, Sakchi, India; the Union Rolling Mill Company and the Indiana and Carnegie Steel companies.

**Safety Appliances and First-Aid Equipment.**—Safety First Supply Company, Hartje Building, Pittsburgh. Series of bulletins. Illustrate and describe a line of safety appliances and first-aid equipment. Practically every form of safety-first porcelain enamel signs in foreign languages, electrical danger and warning signs, signs for coal mines and safety-first and notice signs are included. These are printed in various languages on porcelain enamel. Mention is also made of a line of equipment for emergency hospitals and playgrounds, the latter being covered in a special bulletin, No. 225. Valuable information and illustrations of the methods to be used in installing and handling the various safety-first and first-aid appliances are presented in the bulletins.

**Universal Tool Grinding Machine.**—Gisholt Machine Company, Madison, Wis. Circular. Refers to the advantages to be derived from the use of a universal tool-grinding machine in the way of increased output from the various machines in the shop and the reductions in the amount invested in tool steel and in the cost of forging and grinding cutting tools. The results secured by the use of this machine are briefly brought out and two engravings showing the difference between wasteful and economical tool grinding are presented. A partial list of users of the machine is included.

**Chain Screen Furnace Door.**—E. J. Codd Company, 700 South Caroline Street, Baltimore. Two pamphlets. Give general description and specifications for a chain screen door for boiler furnaces and furnaces and ovens in industrial establishments. As the name indicates, the doors are composed of a number of freely hanging individual strands of steel chain suspended close together from a steel bar so as to form a continuous sheet or curtain of steel. A number of engravings of the door in use are presented. An illustrated description of the door appeared in THE IRON AGE, Sept. 28, 1916.

## Judicial Decisions

ABSTRACTED BY A. L. H. STREET

**RIGHTS OF NON-RESIDENT CORPORATIONS.**—An agreement by a non-resident corporation, which has not complied with the laws of Minnesota so as to entitle it to do business in that commonwealth, to install machinery in a building in the State, is invalid, and not properly treated as such interstate commerce transaction as would be beyond control of State law. (Minnesota Supreme Court, *Palm Vacuum Cleaner Company vs. Bjornstad*, 161 Northwestern Reporter, 215.)

**LIENS FOR MATERIALS FURNISHED FOR PUBLIC WORK.**—Under a contract to furnish steel within New York City free lighterage limits, steel conditionally accepted by the contractor, temporarily stored by agreement in New Jersey at the time of the contractor's bankruptcy, and subsequently used for a contemplated improvement in New York, affords sufficient basis for a mechanic's lien. A lien may be secured under the laws of New York for material furnished for temporary water mains, etc., during the construction of a rapid transit line on the public streets. (New York Court of Appeals, *Church E. Gates & Co. vs. John F. Stevens Construction Company*, 115 Northeastern Reporter, 22.)

**CARRIERS' LIABILITY.**—A railroad company receiving a shipment for delivery to a point on a connecting railroad is liable for injury to the shipment due to the delivering company's fault. Provision in a bill of lading limiting the carrier's liability to an amount less than the actual value of the shipment is invalid unless made in consideration of a lower freight rate than would have applied in case of full valuation. But under a clause limiting liability to "bona fide invoice price" the owner of a second-hand article is not entitled to recover more than he paid for it, although its actual value may be larger. (Kansas City Court of Appeals, *Wilson vs. Chicago, Great Western Railroad Company*, 190 Southwestern Reporter, 22.)

**DELAY IN DELIVERY OF MACHINE.**—Provision in a written contract for the sale of wood-working machinery that "delivery at any specific time is waived" precludes the purchaser from claiming damages by way of loss of use of the machine pending delayed delivery. All the terms of a written contract are binding upon each party in the absence of a showing that he was fraudulently induced to sign the contract in ignorance of the particular provisions involved, or that there was a mutual mistake made in stating the terms. (Kentucky Court of Appeals, *Berlin Machine Works vs. Jefferson Woodworking Company*, 191 Southwestern Reporter, 82.)

**FULFILLMENT OF SALES CONTRACTS.**—Breach of a contract to sell goods cannot be excused on account of the existence of the European war, except as obstructing contingencies have been guarded against in the agreement. But if a contract provided for release of liability of the seller in a "contingency beyond control," and the contract contemplated obtention of the goods from one of the belligerent nations, the subsequent establishment of a governmental embargo on that class of goods would release the seller, if the actual cause of non-delivery. A seller who has made numerous contracts with different customers for the sale of certain kinds of goods is not entitled to prorate deliveries because of shortage of stock, except as the contracts may have so authorized it, or there may have been an implied understanding to that effect through trade custom. (New York Supreme Court, Trial Term, *B. P. Ducas Company vs. Bayer Company*, 163 New York Supplement, 32.)

**CONCLUSIVENESS OF WRITTEN CONTRACT.**—Where a contract for sale of machinery purported to contain all the terms of the agreement and stated that employees of the seller were not authorized to make agreements not embodied in the writing, the buyer could not rely upon verbal statements made by the seller's representative, concerning the capacity of the machinery. A contract for sale of "one 30-hp. simple traction engine," with no warranties except that the machinery would be of good material and equal or better than any other engine of equal size and proportions when properly handled, implied no warranty of the power of the

engine. (California District Court of Appeal, *Mono Irrigation Company vs. State*, 162 Pacific Reporter, 647.)

**RIGHTS UNDER CONDITIONAL SALE CONTRACTS.**—The right of a seller of personal property to reclaim it under a contract provision reserving title in him until payment of the purchase price is not affected by the fact that the seller may have taken chattel mortgages on other goods as additional security for payment. (United States District Court, Southern District of Iowa, *Emerson-Brantingham Implement Company vs. Lawson*, 237 Federal Reporter, 877.) A manufacturer selling personal property to a building contractor for permanent installation as part of real estate (for instance, an elevator to be installed in a building), will not be permitted to reclaim such property under a reservation of title until payment of the purchase price, unless the owner of the building has agreed to the condition. (United States Circuit Court of Appeals, Fourth Circuit, *Otis Elevator Company vs. Palmetto Construction Company*, 237 Federal Reporter, 769.)

**AN ASPECT OF THE LUSITANIA SINKING.**—A sales representative of a manufacturing company who became one of the *Lusitania* victims, while on his way to Europe on business for his company, must be regarded as having lost his life in an accident in the course of his employment, within the provisions of the New Jersey workmen's compensation act, entitling his widow to an award under that law. (New Jersey Supreme Court, *Foley vs. Home Rubber Company*, 99 Atlantic Reporter, 624.)

**CORPORATE OFFICER'S LIABILITY ON NOTE.**—The president of a corporation, by writing his name on the back of a note executed by the company, without the addition of any qualifying language, became individually liable as an indorser. (New York Supreme Court, Appellate Term, *Mechanic vs. Elgie Iron Works*, 163 New York Supplement, 97.)

**FACTORY SITES ON RAILROAD RIGHT-OF-WAY.**—A lease of land owned by a railroad company adjacent to its tracks to a manufacturer for a stated period, without rent or other consideration than the lessee's agreement to indemnify the railroad company against liability on account of the lessee's use of the premises and to permit use of a switchtrack by the railroad company when not used by the lessee, the real consideration being the lessee's agreement to make all shipments possible over the particular railroad, as against competing roads, is invalid under the interstate commerce act as giving the manufacturing company an advantage over other shippers. Recognition of the contract as being in force for several years cannot estop either party from afterward asserting its invalidity. (United States Circuit Court of Appeals, Eighth Circuit, *Central of Georgia Railway Company vs. Blount*, 238 Federal Reporter, 292.)

**SUBSTITUTION OF DEBTORS.**—The facts, that a retail merchant indebted to a wholesale house sells his business under an agreement whereby his successor is to pay the debt as part of the purchase price of the business, that the wholesale house is advised of the arrangement and afterward accepts notes of the successor extending the time for payment, do not preclude it from enforcing the primary liability of the original debtor. Before the original debtor will be deemed to have been released it must appear clearly that the creditor intended a release. (Texas Court of Civil Appeals, *Wilson vs. J. W. Crowder Drug Company*, 190 Southwestern Reporter, 194.)

**MACHINERY ADJUSTMENT CONTRACT.**—Where the owner of an engine engaged a motor works company to fit his engine on a cast frame connected to a pinion shaft with cut gears to get two speeds on drums, etc., the contract not warranting the power of the engine to drive the drums at such speeds, the apparatus to be furnished by the motor works, including the drums, the engine owner could not escape liability for the price on the ground that the engine when mounted would not develop the power necessary to do the work; there being no defect in the hoist and drums furnished by the motor works nor in the adjustment of the engine. (Washington Supreme Court, *Mianus Motor Works vs. Vollans*, 162 Pacific Reporter, 49.)

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